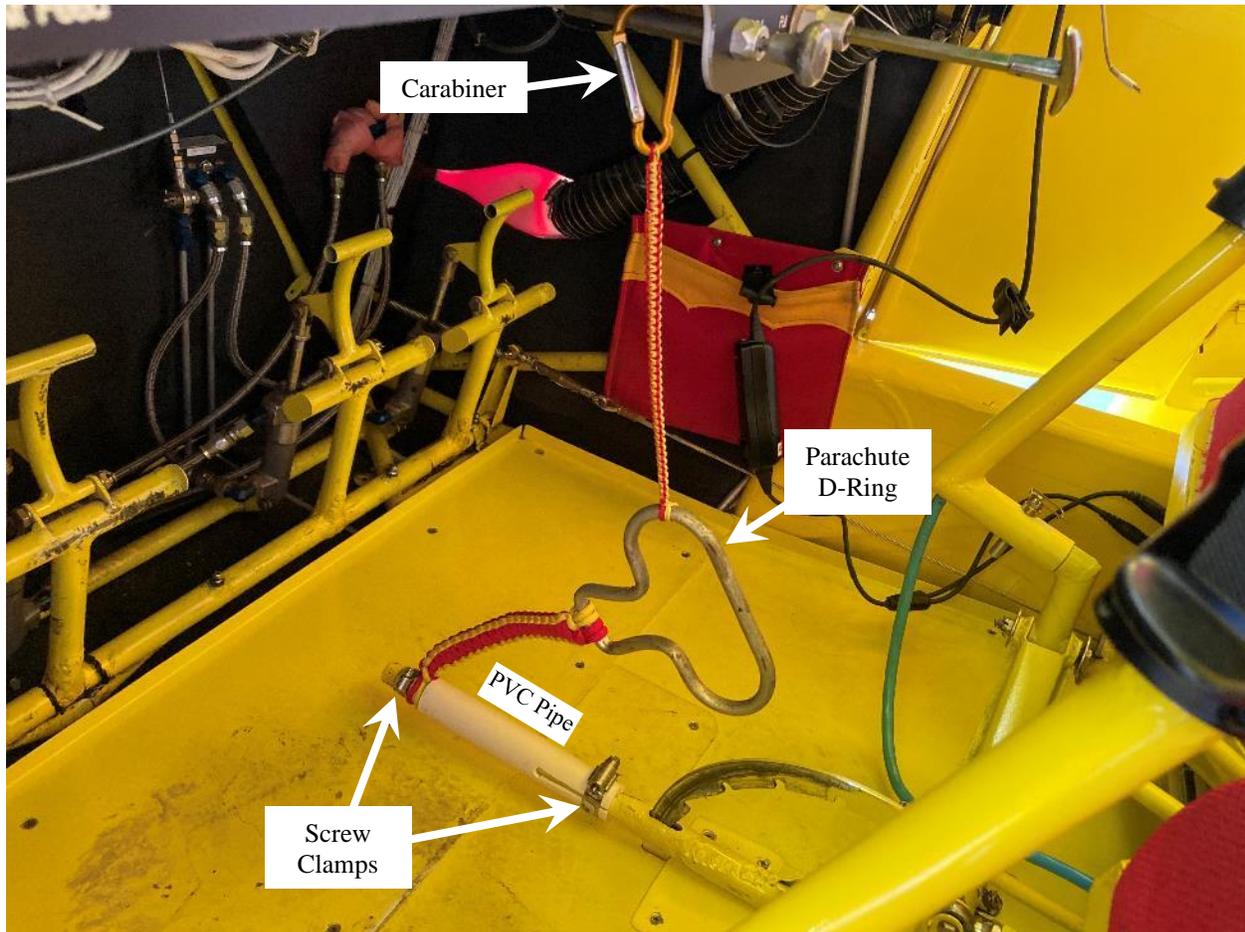


The Trailing Edge

October 2022

Bearhawk Auxiliary Flap Handle



Bob Barrows is a tall man. With height comes long arms and long legs. Since the RB-4, the airplane that would become the prototype Bearhawk, was expected to be a one-off airplane for his own use, he understandably designed it to fit himself.

I'm only 5' 9" tall, which is a reasonably average size. While building my Bearhawk, I moved the rudder pedals 3 inches closer to the seat than shown in the plans, which still puts me most of the way forward in the seat. My reach to the stick and panel has been quite acceptable.

What I've had trouble with for the last 14 years was reaching the flap handle, especially for the first two notches of flaps. To reach the release button with the flaps fully retracted requires bending over enough to put my face in the instrument panel, which isn't really good for flight safety. This was partially mitigated by ramping the first two notches so that I could pull the handle up without reaching the release button. Even so, it still required an uncomfortable amount of leaning forward to reach the handle. Once the flaps are down two notches, I can reach the flap handle and release button reasonably comfortably.

The Search for a Solution

So, for years I've been noodlin' trying to come up with a way to actuate the flap handle more safely without having to stuff my face in the instrument panel. One guy I know was actually marketing a product for just this purpose. It consisted of a second handle above the flap handle for pulling it up and a mechanism for actuating the button so that the handle could be moved up and down. He sold his product for several types of aircraft, and asked

for access to my Bearhawk so that he could design a similar product for the Bearhawk. Because of the unique geometry of the Bearhawk, any auxiliary handle he tried collided with the seats when the flaps were at higher deflection. After two or three attempts I think he gave up, as I haven't heard from him again.

As I continued thinking about possible solutions, I realized that the biggest problem was trying to figure out a method to remotely depress the flap handle release button. After much consideration, I realized that I didn't really need to be able to remotely depress the flap handle release button. I do all of my takeoffs with the flaps retracted, since the takeoff distance is not significantly reduced with flaps extended. The airplane would rapidly accelerate above the flap limit speed before the flaps could be retracted unless the nose was pitched uncomfortably above the horizon. Stuffing my face in the instrument panel to retract the flaps while still very close to the ground didn't seem like a safe thing to do. While this sort of risk may be justified from short back-country airstrips, it was not justified for my style of runway to runway flying.

Otherwise, anytime I would retract the flaps would be at a high enough altitude that I felt safe enough briefly stuffing my face in the instrument panel, or else I was safely at a stop on the ground. Therefore, I could get by with only a system for lowering the flaps the first two notches. After that I could actuate the flap handle normally.

I had seen some other builders that had welded a simple handle about three inches above the flap handle. This would still require a significant amount of bending over. If the handle were high enough to reach without bending over, it would interfere with the seats at higher flap deflections.

The Epiphany

While sitting in my Bearhawk trying to figure out a suitable solution to this problem, I realized that I didn't need a rigid handle. All I needed was essentially a rope tied to the flap handle and a handle to pull on. I would also need some method for keeping the handle where I could reach it so I wouldn't have to reach down to the floor to pick it up, which would defeat the whole purpose.

I first tried tying the cord down near where the sector goes through the flap handle. Flight testing showed that I could pull on the first notch of flaps, but there wasn't enough leverage to pull the second notch of flaps. Thus, I modified the design to pull near the end of the flap handle for more leverage. In this configuration I was able to successfully pull on the first two notches of flaps in flight, so it was ready for the final design.

The Final Design

The final design is as shown in the photo above. The pull handle is way over the top from what is needed. My handle was originally the D-Ring for an Air Force high speed ejection parachute as used in the T-38. Back in 1981 I was a survival instructor at the US Air Force Academy. Two groups of students each cut up a condemned parachute pack to use the materials to fabricate various pieces of improvised survival gear. I saved the parts they didn't use, and have had them in a box for over 40 years, hoping someday I could find a use for them. In this case, I found a use for at least one piece. In reality, a 3-inch piece of 3/4 inch dowel would have worked just as well.

A simple piece of 550 parachute cord is sufficient to connect the pull handle to the flap handle. The fancy overbraiding with cobra knots is strictly aesthetic and adds nothing to functionality. I just like doing that.

A smaller cord is used to hang the pull handle from some convenient structure above. This keeps the pull handle where it can be reached. A carabiner allows easy release from the structure above if needed.

A piece of 3/4 inch PVC pipe (from the aircraft supply section at Home Depot or Lowe's) goes over the flap handle, and keeps the pull cord from sliding down the flap handle. The PVC pipe is restricted from sliding down the flap handle by the welds around the opening for the sector. The geometry of your arm pulling on the third and fourth notch of flap will tend to cause the PVC pipe to be pulled up over the end of the flap handle. This would not be good. To prevent this, a slot was cut in the side of the PVC pipe and a screw clamp was placed at the lower end to securely clamp the PVC pipe to the flap handle and prevent pulling it off.

Finally, a small screw clamp is placed at the end of the flap handle, just below the release button, to keep the pull cord from sliding off the end of the flap handle. Carefully position the clamp so that it doesn't interfere with your hand as you are pulling on the third or fourth notch of flaps.

- Russ Erb

