

Winch Training Preparation

Introduction:

Earning a ground launch endorsement has been on my bucket list ever since I started flying gliders back in 2002. I first learned about ground launching, and specifically winch launching, while studying for my glider category add-on rating.

I saw my first winches (Roman's Design and Hydrowinch) at the 2008 SSA convention in Albuquerque. If I remember correctly, the Hydrowinch folks were using Condor to help introduce glider pilots to the excitement and benefits of winch launching, and actually had copies of Condor for sale. I was on the other side of the convention floor, using Condor to promote the use of flight simulation to improve glider flight instruction. After flying Condor, many folks I talked to wanted to buy a copy. I wasn't there to sell software; I was there to sell an idea. Paul Remde hadn't yet started offering Condor, so I referred everyone to the Hydrowinch folks. If my memory serves me, they sold all 65 copies they had.

The other thing I remember about ABQ is meeting Bill Daniels for the first time. Bill showed up at the Condor sim-

ulation booth and, with his characteristic enthusiasm, took over the workstation, and proceeded to conduct a mini-seminar on winch launching. And then he was gone. Who was that masked man?

My winch launching fantasy lay dormant until the spring of 2011 when, while attending the Senior Nationals competition at Seminole Lakes Glider Port near Orlando, I met Don Ingraham, owner of Cross Country Soaring, Inc. in Faribault, MN. Don had bought a surplus winch from the Canadian Air Force and had spent the winter in Florida providing winch launch training at the airport in Immokalee (near Naples and Fort Meyers). He and his family were on their way back to Minnesota and had stopped to enjoy the Senior's event. On one of the competition's days off, Don set the winch up and took two launches with Karl Striedieck, and one with Iris, in Karl's Duo Discus. Unfortunately, I missed seeing the launches, but I did get back to the airport in time to get a good look at the winch and talk to Don about training opportunities. I was starting to spend more time in Florida in the win-

ter and hoped to connect with Don the following year.

My next nudge toward a ground launch endorsement occurred the summer before last (2011) when a group of enthusiasts (including my friends Dr. Dan Johnson of *Soaring Rx* fame and CFIG Paul Randall) started a flying club in Menomonie, WI (east of Minneapolis and about two hours drive north of my home in Madison, WI). Along with incorporating flight simulation into their qualification, training, and proficiency policies and procedures, the new club bought a winch as a way to optimize their glider flight training. Being the conscientious guys they are, they arranged to have Bill Daniels conduct their winch operations training. Knowing of my interest in all things glider-related, Paul invited me to the winch training camp. While it had been my intention to simply audit the course, circumstances resulted in me being on-board the very first winch launch at Menomonie. If I wasn't hooked before that day, I certainly was after.

This past September, because I'm not getting any younger, I decided it was finally time to earn my ground launch endorsement. The following paragraphs document my experiences to date, and how I incorporated glider flight simulation (Condor) into the process.

Preparation - CCSI

Don Ingraham owns and operates Cross Country Soaring, Inc. (CCSI), (<http://crosscountrysoaring.com/>) a very successful commercial glider operation in Faribault, MN. He has two really nice, clean, nearly identical, and well-equipped Grob 103 Twin II gliders, a Socata Rallye tow plane, an ingenious mechanism for ground handling the Grobs, and a "Winch." Along with the full range of services normally available at a commercial glider operation, CCSI offers an extremely popular winch-launched ride option and an excellent winch-based ground launch training program.

Scheduling is easy using CCSI's online calendar, so at Don's recommendation, I signed up for a total of four, two-hour blocks on two consecutive days. CCSI offers a 20-launch package for \$900 that includes glider rental, instructor,



Winch Launch – Outside View – Condor Simulation



the winch, winch operator and required ground crew. More launches are available as needed.

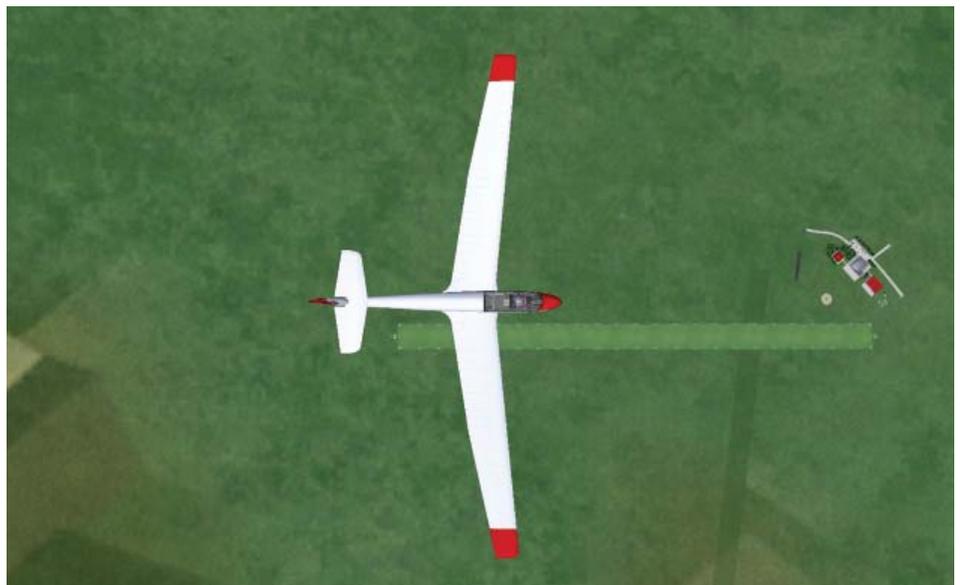
Study materials include the *Grob 103 POH*, *CCSI Winch Launch Training Guide*, and *Faribault Winch Operations Manual*, all available for download in .pdf format from CCSI's web site. Interestingly, the *Launch Training Guide* contained a number of graphics that had been generated using Condor; yet another instructional use of the software.

I began my preparations by reading all three CCSI documents to get an overall understanding of winch launch concepts and procedures, including pre-launch preparations, normal launches, ground roll technique and hazards, liftoff and rotation technique and hazards, airspeed control on the winch, glider to winch communications (signals), crosswind techniques, and managing launch failures (initial roll, rope breaks, release failures, winch power failures, etc.). With a basic understanding in place, it was time to introduce simulation into my preparations.

Preparation – Condor – Realism

Condor offers three options for starting a flight; Aerotow (the default), Airborne, and “Winch.” Previously, without really knowing very much about what I was doing, I had experimented with winch launches in Condor. With the exceptions of the rapid acceleration to take off speed and the incredible (compared to aerotow) deck angle during the climb, a winch launch seemed quite manageable and, in many ways, easier, dare I say “safer,” – and certainly faster – than an aerotow. What I wondered, however, was how well Condor actually simulated a real winch launch.

Again, Bill Daniels (a.k.a. the Masked Man) to the rescue. Bill has much experience with winch launching and is often called upon to provide training and consulting to clubs and commercial operations considering or committed to this method of getting a glider into the air. Because of my concern with the fidelity of any simulation I might use in my instructional activities, I asked Bill, at one of the SSA conventions, just how well Condor simulated a real life winch launch. His response: “Very well.”



Preparation – Condor – Normal Launch

I began my simulation-based introduction to winch launching as I do any lesson; I developed a Condor flight plan (environment) specific to the task. I used the Murska-Sobota airport in Condor's default scenery (Slovenia 1.03). I specified relatively calm weather conditions (no turbulence) with a steady 10-knot wind from the east (straight down the 9/27 grass runway), selected the ASK-13 as my launch vehicle, and opted for a “Winch” *start type* with a *Rope break probability* of 0%.

When launching off a winch, your expected altitude gain is roughly half the length of the rope. I could get launches to about 1800 ft AGL at Murska-Sobota in Condor. To see how realistic that

might be, I did a Google Earth search on Murska-Sobota, Slovenia, found the airport, and used the distance tool to measure the length of Runway 9/27; 3800 feet. The red line in the picture above shows the distance from the glider staging area (left) to the winch (right). For comparison purposes, the second picture shows the Murska-Sobota airport from overhead in Condor.

After taking a couple “normal” launches, it was clear I needed to make a modification to my flight plan. Condor has a relatively limited field of view. That, in combination with the extremely high (45-50 degree) climb angle obscuring your real, or simulated, view of the horizon during a winch launch, makes it very difficult in Condor to maintain a proper

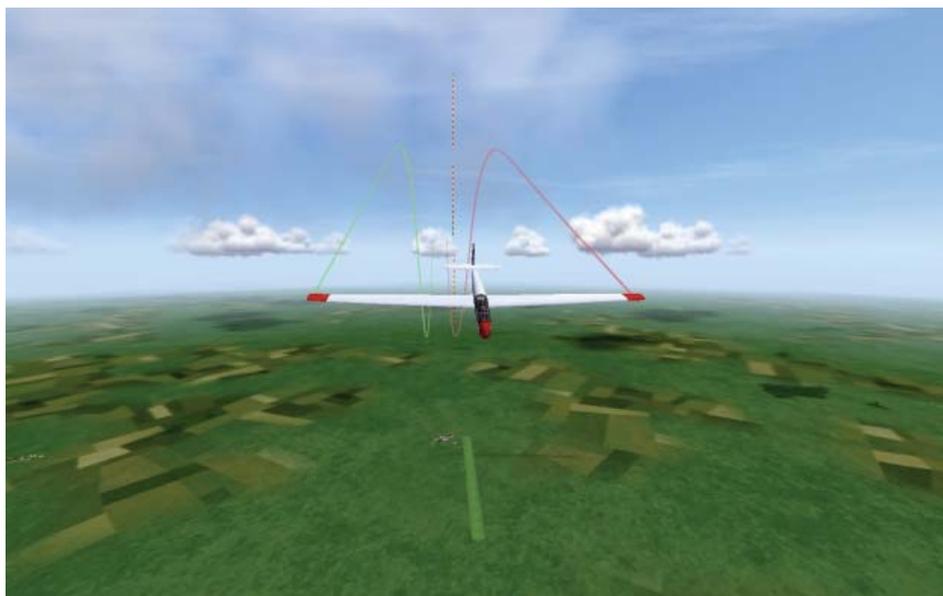


wings-level attitude in the climb. In the real world, you have your peripheral vision; in Condor you need to be moving your field of view back and forth between the instrument panel (to monitor airspeed) and an outside lateral view to maintain the wings level. This is very disorienting. To compensate for the simulation's limited field of view, I used Condor's visible turn point feature. When made visible (keyboard command "J"), a Condor turn point appears as a 5000 meter (16,400 ft) vertical pole. By placing a turn point about 4 miles directly off the departure end of the runway, I now had a visual reference to use while climbing, even at very steep deck angles. All I had to do was keep the yaw string pointed at the turn point (*see photo below*).

After flying a few dozen normal launches using the techniques describing in the CCSI Winch Launch Training Guide, I was ready work on dealing with winch launch failures.

Preparation – Condor – Launch Failures

The CCSI Winch Launch Training Guide describes a maneuver called a "zero-G pushover." It is a technique used to transition from any part of the climb to a safe glide speed and attitude from which you begin your landing approach. To practice the maneuver in real life, the training guide recommends being towed to altitude and initiating the zero-G pushover by first diving the



Practicing the Zero-G Pushover in Condor

glider and then zooming up to a given climb attitude. As the airspeed decreases to winch launch speed, you imagine the rope breaking, at which point you execute the zero-G pushover, establish a nose down attitude equal to the nose up attitude at the time of the rope break, wait for the glider to attain a safe glide speed, and then recover to a normal landing approach speed and attitude. To learn and practice the zero-G pushover maneuver in simulation, I needed to develop another Condor *flight plan*.

Depending on the altitude at which a launch failure occurs, the pilot needs to decide whether to land straight ahead on

the remaining runway or fly an abbreviated pattern to land into the wind. If landing straight-ahead is not an option, it is because the glider is too high, at which point an abbreviated pattern comes into play. The abbreviated pattern begins with a 180-degree turn to a downwind leg and ends with another 180-degree turn onto final. The length of the downwind leg depends on available altitude.

To simulate the zero-G pushover followed by a 180-degree turn, and do it repeatedly for the practice, I developed a flight plan using a pair of visible turn point poles placed several miles from each end of the runway at Murska-Sobota, and used an airborne start (no need to spend much time on tow). Condor's airborne start places you directly over the approach end of the runway, aligned with the runway heading, and at an altitude of your choice. To ensure adequate practice time (cycles), I opted for the Allow height recovery option that provides you with an additional 1500 ft of altitude by simply pressing the "Q" (miracle) button on the keyboard.

To practice the zero-G pushover maneuver, you initiate the flight, make the turn points visible (letter "J" on the keyboard), dive the glider, pull up into the climb angle of your choice, wait for the speed to decay below your normal target winch speed (as it would if the rope broke or the winch lost power), execute the zero-G pushover maneuver, regain a safe



Winch Launch – Cockpit View – Condor Simulation



flying speed, and initiate a 180-degree turn to downwind. You are now lined up with the opposite turn point visual reference and all set to begin the next maneuver cycle. When you start to get low, keyboard command “Q” gives you the altitude required to continue your practice session.

Once you have mastered the zero-G pushover / 180-degree turn combination, it’s time to simulate random launch failures. Condor’s winch launch option includes a “Probability of a rope break” specification, ranging from 0-100%. I set the probability to 80% and practiced at least 100 launch failures.

Real Life Training – The first 13 Launches

On September 18 of 2012, I showed up at Cross Country Soaring ready to apply my simulation-based winch launch preparation to the real thing. On the first two launches, CCSI’s syllabus limits the student’s responsibility simply to observing the launch. The wisdom of this policy became immediately apparent. Nothing I had ever done, in the normal course of glider training, had come even close to preparing me for what I was about to experience.

The initial acceleration was startling (almost frightening), and plastered me back into my seat. In the first 2-3 seconds, 1200 lbs of Grob 103, seasoned instructor, and stupefied winch-newbie was accelerated from a standstill to flying speed. The glider seemed to literally jump off the ground and, in the next 2-3 seconds, accelerated to its target climb speed (55-60 knots) while simultaneously pitching up to what looked like a vertical climb (actually “only” 45-55 degrees). My feet fell off the rudder pedals as gravity dropped my legs into my lap. I couldn’t hold my head where it belonged. There was nothing in the canopy but sky. Thirty seconds later, 2000 ft above and 4000 ft down the runway, as the rope angle from the glider to the winch reached about 70 degrees, there was a subtle change in the pull on the glider as the winch operator cut the power (I didn’t feel it). We pitched to a normal glide attitude and there was a click as the CG hook did a normal, automatic back release (‘didn’t hear that either). I don’t think Condor simulates the

winch power reduction. Condor expects you to pull the release before passing over the winch. If you don’t, it rightly mocks you with the on-screen message “*S. Manley has trouble with winch launching.*”

On my second demonstration launch, I had enough sense to push myself back into the seat, put my head firmly on the headrest, and keep my feet on the rudder pedals. On the third launch, Don did the takeoff and rotation and had me fly the climb, using normal pitch inputs to keep the climb speed under the Grob’s maximum winch airspeed of 64 knots. On the fourth and following trips up, I flew entire launch. After each release, I would turn the controls over to Don and have him fly the Grob back to the runway. It was the quickest and safest way back to my next launch, and I learned a lot by watching a superb glider pilot fly approaches and landings.

I did a total of 13 winch launches that day. After launch #10, we were to begin working on launch failure simulations; Don and Christian (the winch driver) had conspired against me to develop an elaborate scheme of coded, secret communications. Unfortunately, a Cessna trainer showed up and decided to use our launch runway for touch-n-go landing/takeoff practice. Being the considerate guy he is, Don held off on calling for any training procedures that would have tied up the runway (e.g. a low-altitude release and midfield landing). Mother nature and Murphy, however, had other plans. On our “13th” launch, there was a loud “thump” near the top of the climb. I reacted, as I had trained in Condor, with a zero-G pushover. Don had the presence of mind to pull the release. As it turned out, we had experienced an actual rope break with the Spectra winch rope having snapped near the ground. The winch line strop, parachute, and 1500 ft of Spectra dropped nicely onto the airport below and the ground crew had it all neatly laid out for retrieval by the time we got the Grob back on the ground. As explained in the texts, practiced and internalized in simulation, and experienced in real life, a properly managed winch launch failure is pretty much a nonevent.

I hoped to finish my training the next day, but strong direct crosswinds weath-

ered us out. I rescheduled the rest of my training for October 15, hoping to earn my ground launch (winch) endorsement; by the time I had to submit this article to Soaring’s Editor, but I got weathered out again. I will have to write an update in some future edition of Condor Corner.

In Conclusion

I believe being able to visualize and practice the basic concepts and procedures related to winch launching enabled me to much better prepare for my real-life training. Don made a comment the first day, something to the effect “you’ve caught onto this pretty quickly.” I have learned over time that I am “not” a particularly quick study. It usually takes me quite a bit of work, study, instruction, practice, and consultation before I get the hang of something. I did advance more quickly than expected; I attribute my rate of progress to the advance availability and quality of CCSI’s study materials, my mastery of that material before showing up at the Faribault airport, Don Ingraham’s talent as a CFIG, and in very large part to the many hours I spent using a realistic glider flight simulation (Condor) to bridge the chasm between simply reading about winch launches and actually flying them.

For a nice pictorial representation of CCSI’s winch operations and a video of a launch, connect to CCSI’s homepage (<http://crosscountrysoaring.com>) and click on “The Winch.”

Scott Manley owns, and occasionally actually flies, a DG-303. The back of his pilot’s license reads: Commercial pilot; airplane single-engine land & sea; instrument airplane; glider. He lives in Madison, Wisconsin and flies as a commercial pilot, glider flight instructor, and tow pilot for Sylvania Soaring Adventures in Beloit, Wisconsin.

