

Column: Condor Corner

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Title: A Major Break-through – Nyal’s Squib – My Condor Story

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Introduction

In this issue of Condor Corner, I will be reporting on an important technological breakthrough effecting simulation-based flight instruction at-a-distance. Also included in this issue, the second, in what may become a series, of snippets from my CFIG colleague Nyal Williams, and the third installment of “My Condor Story.

A Major Break-through

I am cautiously optimistic I have solved (actually stumbled upon a solution to) one of the more vexing problems related to doing simulation-based flight instruction at-a-distance;

not being able to see what my student is doing (from inside the cockpit) in real time.

Condor has always had the ability to graphically display various outside views of other gliders connected to a Multi-Player (networked) session. It truly is amazing to be able to look outside your Condor cockpit and see another glider flying nearby; knowing it is being piloted by someone, for example, in Japan.

Condor does this in near-real time using the exchange of small parameter files. Each glider connected to networked session regularly sends specific information (e.g. latitude, longitude, altitude, airspeed, vertical speed, etc.) to the Condor Server managing the session. The Server then redistributes the information for each individual glider to all the Condor installations connected to that session. So every participant’s Condor installation has continuous access to the specifics for every other glider in the session. The very small size of these parameter files allows them to be moved almost instantaneously over the Internet. The local Condor application then uses these glider specific files to do the heavy lifting of generating the graphics. The results are stunning; you are not alone in the sky.

So, the best, and most obvious, solution to my distance education dilemma has always been for the Condor developers to make, what I believe to be, a very simple change to their software; the addition of a cockpit view of a networked glider. I have tried every thing I can think of to make that happen. No joy. While still hoping the Condor guys might someday grant my wish, I continued to investigate other options.

The most obvious alternative solution involved computer software applications loosely described as “screen-scrapers”. These applications take the video output from a computer monitor and send it over the Internet where it is displayed by the same application running on another computer. For example, I believe this is how the “Screen Sharing” feature works in Skype.

The challenge with screen-scrapers is the large bandwidth requirement for the transfer of full color video images taken off large, high-resolution monitors. The time it takes the Internet protocol to package up, transmit, and reassemble these very large files results in what is known as “network latency”; the viewer seeing the video output some amount of time “after” it actually occurs. For a lot of applications, this latency is not a problem; for flight instruction, it most definitely is.

And so, for the last 5 years, while continuing to look for an alternative, I have been compensating for this deficiency by talking my students through Free Flight sessions while imagining (hoping) they were doing on their end what I was doing on mine; and providing critique by having them send me Condor Replay files that I would review before providing them a written critique of their performance; not very efficient, but the best I could do under the circumstances.

Then one day, about a year ago, I connected via Skype with David Fisichella (Jan. 2014 - My Condor Story) for one of our regular flight training sessions. What I saw in my Skype window was the video output of David’s monitor running Condor. To my surprise, there was no noticeable latency in the transmission. The image resolution wasn’t perfect, but it was clearly good enough for me to easily see what David was doing. It was great; our sessions were so much more productive.

Looking back, I wish I had tried sooner to understand why David’s video implementation was working where everything else I had tried in the last five years had failed to solve the latency problem. Because he was director of ship-board technology for Woods Hole Oceanographic Institute, I simply assumed David had access to an exceptionally fast Internet connection that allowed him to work from home. Fast upload speeds are certainly the exception rather than the rule for home network service, so it wasn’t a solution I could apply with my other students.



Webcam watching my every move

Then, for some reason, after months of experiencing all the advantages of being able to monitor David's flying in real time, I finally asked him specifically what technology he was using. As it turns out, his home Internet connection wasn't anything out of the ordinary and he was using the built-in webcam on a low-end net-book running Skype audio/video conferencing. It made little sense that all this low-end technology could be getting the job done, but you can't argue with success. So what was different? The possible differences seemed to be the use of a webcam instead of a screen-scraping application and using Skype's video conferencing feature instead of its screen sharing function.

So, I started doing some experiments. My iPad has WiFi network capability, runs Skype, and has two built-in cameras. So I started a Condor session on my PC (actually a Mac using Bootcamp) and initiated a Replay (*Aerotow Demonstration*). I then called my buddy Nyal on Skype, turned on the Skype video option, and pointed the iPad's camera at my Condor monitor. Nyal could quite clearly see the action unfolding. To test the latency, Nyal had me point the camera at the chronometer on my glider's instrument panel, and he read off the seconds as they ticked by. There was little or no latency; he was seeing what I was seeing at almost exactly the same time. This was starting to get very exciting.

So what happened to the latency? I was beginning to suspect the lack of latency was a function of bandwidth requirements. Obviously, the digital data needed to support web-based video conferencing was only a fraction of what it takes to capture and transmit the output from a large, high-resolution computer monitor. Smaller amounts of data can be moved much more quickly over the Internet.

The next step was to see if the image quality could be improved with the use of a higher quality webcam. I was somewhat concerned a high definition (HD) webcam might actually defeat my purpose, but David had sent me a link to Skype's webpage that gave me hope. Apparently Skype's video conferencing function takes into consideration a number of factors, including the capability of the webcams and the Internet speeds available at both ends of the line, and then adjusts the video transmission process accordingly. So I took a chance and bought a Logitech 615 webcam with 1080p resolution at Best Buy (\$60). I then ran a series of tests (Nyal in NC, my father/son student team in WI, my buddy Steve in Albuquerque, my distance student in Utah); in each case doing the instrument panel chronometer latency check. There was virtually no latency on any of the calls; not even those from my winter headquarters in Florida to Utah and New Mexico.

Conclusion:

Being able to observe and critique my students flying in real time is already making a huge difference the quality and efficiency of my simulation-based glider flight instruction at-a-distance:

- No more having to talk my students through Free Flight sessions wondering if they are really doing what I am describing. I can see what they are doing as they do it. Initial critique is immediate and therefore much more effective.
- While I continue to do the presentation and demonstration phase of each lesson using Condor's Replay capability, to make or clarify a point I now have the option to do live, ad-hoc demonstrations as needed.
- The critique of student practice sessions, previously a time consuming process of exchanging and reviewing Condor Replay files and authoring emails, can now be accomplished with live ad-hoc or scheduled Skype-based review sessions; and done in minutes instead of hours.

I am now encouraging (actually requiring) all my distance students to be capable of webcam-based video-conferencing via Skype.

For the self-directed among you, real-time observation and critique makes it a lot faster and easier for your mentors to give you the feedback you need; anytime, anywhere. Just call them up on Skype and say "Hey, watch this and tell me how I'm doing."

This is absolutely HUGE!

Thank you David Fisichella.

Nyal's Squib

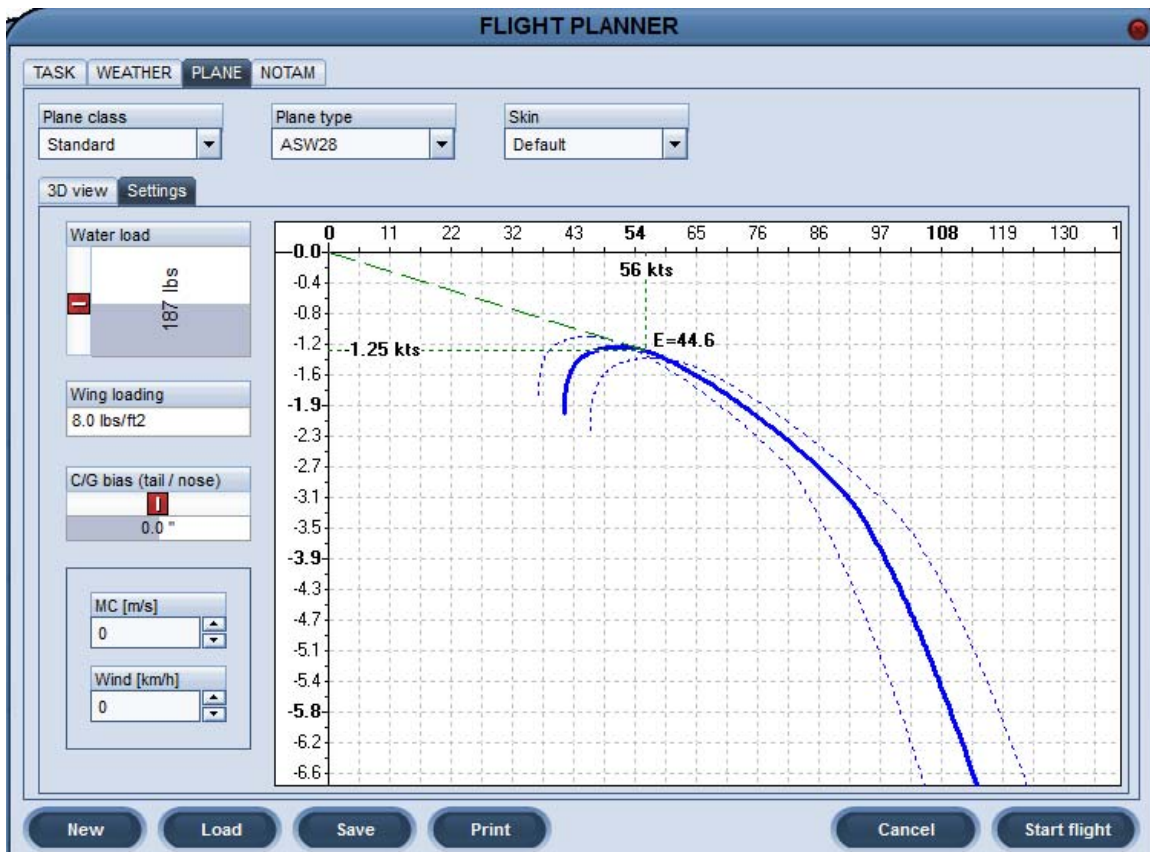
It's Not a Toy

by Nyal Williams - CFG

Why do some pilots think the Condor Simulator is little more than a toy while others think it is God's gift to glider pilots? I confess that I don't know, but I am in the latter group.

Maybe the first group got a casual introduction to Condor and didn't explore its capabilities. It does take a good bit of digging to find out what Condor can do. Here are some of the things not readily apparent, but easy to use.

1. You can set the C/G, and thus change the performance characteristics on every one of Condor's gliders.
2. You can add water ballast (in the amount you choose) to all except the trainer.
3. You can see the water ballast's influence on the glider's polar while you are adding it.



4. You can dump water in flight in the amount you choose.
5. The navigation PDA gives you immediate access to wind speed and direction,

- both of which vary subject to terrain influence.
6. You can choose wind direction and speed, cloud base (by setting temperature and dew point), cloud formation (by setting the height of the temperature inversion), and amount of turbulence for any flight.
 7. The sun moves across the sky properly during your flight in any scenery you choose.
 8. You can choose not only the season, but also an exact month, date, and time of day for any flight you choose, in any scenery.
 9. You can record any flight you make and play that recording against yourself in real time and learn whether different decisions will improve your time to finish the task. You can race against your self!
 10. You can race against other pilots and see each other's gliders.

No doubt there are other capabilities that I haven't discovered. If you are one of those glider pilots who has dismissed Condor out of hand, give it a really serious go; you'll be amazed.

About the Author

Nyal Williams started flying in a J-3 Cub in 1953. In 1954, while serving in the Army in Europe, he learned to fly primary gliders off a winch. He began instructing in a TG-3 in 1965 before there was such a thing as a CFGI. Nyal has provided glider flight instruction for the Tarheel Soaring Society and Strawberry Hill soaring operation in his native North Carolina, and the Central Indiana Soaring Society (8 years as chief instructor). He has provided motor-glider instruction in a Katana Extreme. He has been an SSA member for 58 years and has twice been designated the SSA-Region 4 *Most Productive Instructor*. Nyal earned his Diamond altitude, goal, and distance pins, all after the age of 75, and in 2010 received the F.A.A.'s highly prestigious Wright Brother's Master Pilot Award.

Nyal recently moved back North Carolina where he currently provides simulation-based glider flight instruction at-a-distance to glider rating candidates all over the country. I consider him a great friend and mentor.

My Condor Story

I Shudder to Think I Almost Quit ***by John Duke***

My club, excellent though it is, suffers from precisely the problems described in the February 2012 Condor Corner article; too few instructors, too much demand for the available equipment, too little good weather. Getting all of these components to come together seemed akin to holding a winning lottery ticket. Within my first year of membership, I had worked hard to meet my fellow members, to understand the club's policies and politics, to do my line duty, and generally to learn as much as I could about the sport of soaring and about my club. While all this was a great experience and I had

made many new friends with similar interests, I was nowhere near achieving my goal of becoming a glider pilot; the reason I had joined the club in the first place.

So, in October of 2011, after reading about his success training glider pilots at-a-distance, I contacted Scott Manley asking if he would consider taking me on as a student. Being very familiar with simulation-based training in the medical profession, it sounded like it might just work for me in gliding. In short, my simulation-based glider flight training turned out to be an amazing turning point in my entry into soaring.

Instead of waiting for the stars to align in the real world, my simulation-based training allowed me to start making real progress, and the capacity to practice daily helped me retain what I had learned. The whole process was very satisfying, very efficient, and VERY cost effective.



The Unavoidable Post-Solo Smile

So, how well did it work? After having completed most of my simulation-based training, it was now the spring of 2012 and I had the opportunity to fly a real glider with one of my club's most experienced pilots. Both of us were amazed at the progress I had made over the winter.

With new found confidence, I decided to continue my flight training at the local commercial glider operation. The first flight briefing began with the usual questions; what have you flown, how much, etc.?

Once in the real glider, the instructor said, “You take the ship and I’ll come on the controls as needed”. Twenty five minutes later, I had accomplished my first complete flight in a real glider; takeoff to landing. It was my first flight in a real glider in over 6 months, my first flight at this airport, my first flight in this type of glider, my first flight with this instructor, and only my 4th instructional flight in a real aircraft.

My instructor was impressed and I was amazed and excited, so I took two more flights and logged another forty-five minutes of flight time.

As my training continued and my instructor and I got to know each other better, I eventually confessed I had completed a course of simulation-based instruction (Condor) with Scott Manley of Soaring Magazine fame. To further enhance my training experience, I went home from the airport each day and simulated that day’s lesson, including approximating the wind and weather.

A short 3 months and 44 flights later (for a total of 47 instructional flights) I soloed a real glider into a beautiful sunset that I will never forget! It was September 9, 2012; less than 10 months after starting my simulation-based training.



Sunset Solo

Immodestly, the results of my simulation-based training had been stunning and a real confidence builder. Everything I had learned in Condor transferred over to the real world. Barely a year after working with Scott, I had soloed a real glider, passed the written test, and was moving steadily towards the practical test; not dreading it, but actually looking forward to it.

As I approached the practical test, Scott offered any help I felt necessary. But since I had already worked through a simulated practical test as part of Scott's course, I just returned to those test flight simulations and practiced in the sim world as well as the real world. When the day came, I faced the FAA inspector without anxiety and passed with flying colors.

Now flying as a private pilot with a glider category rating, I shudder to think I almost quit the sport of soaring out of frustration.

I've transitioned back to my club and my friends there, each day flying further and further from my home airport as I work towards C and Bronze badges in preparation for going cross country.

Of course, part of my preparation for flying cross-country involved more simulation, especially during the winter months. Having become completely convinced of the value of training in simulation, I approached Frank Paynter and, after reading his excellent book, "Cross Country Soaring with Condor", I successfully completed his course on cross country and competition flying.

Also, as frequently as I can, I fly simulated cross country tasks on U.S. Nightly Soaring (U.S.N.S.); continuing to develop the skills needed for cross country flying and maybe, just maybe, my first competition next year. I can't yet run with the big dogs on U.S.N.S., but I only occasionally have to land out on a task, and usually finish respectably well.

My infectious enjoyment of soaring is now pretty well in place, with all the accompanying signs and symptoms. I read Soaring cover to cover (always starting with Condor Corner), I make a bee line for the glider joint whenever possible, and I am constantly scouring ads looking for and dreaming about the purchase of my first glider; reading reviews of flight tests and owner experience. I am grateful to Scott and Frank for their innovative and hearty embrace of this wonderful tool to advance our chosen sport and pastime. They are excellent ambassadors and I consider it an honor to count them both as friends.

About the Author

John Duke is easily one of the nicest people I have ever met; a true southern gentleman. He makes his living these days as a self-employed Certified Registered Nurse Anesthetist. I once teased John about getting paid to put people to sleep. His reply: "No sir; I get *paid* to wake them up.

John's mild manner might disguise the fact he was a professional race car driver in his younger days. After being awarded the Winfield American award from E'cole de Pilotage Winfield (the Winfield Racing School) at Circuit Paul Ricard in southern France in 1982, John went on to race in the Sports Car Club of America; in both amateur and professional series, as well as the 24 Hours of Daytona, mostly in open wheel and sports racing cars. As principal of Duke Motorsports, John continues to pursue his passion for

racing by managing the development of young racing drivers looking to acquire their Federation International Automobile professional and competition driving licenses.

John was member of the simulation-based glider flight instruction winter class of 2011-2012. He soloed a glider and earned his private pilot glider certification later that summer. John is an active and contributing member of the Texas Soaring Association. It was a joy and my privilege to work with him.

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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 and glider flight instructor for Sylvania Soaring Adventures in Beloit, Wisconsin.

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