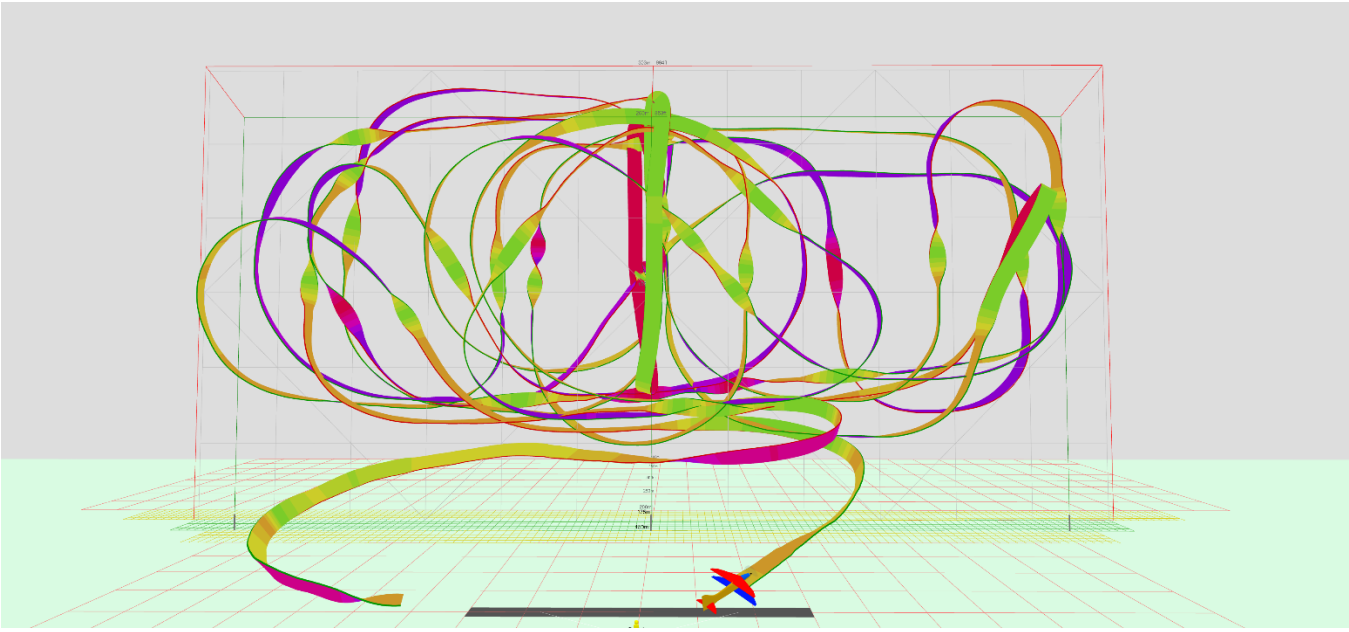
A New and Brutally Honest Pattern Coach

By **Earl Haury**

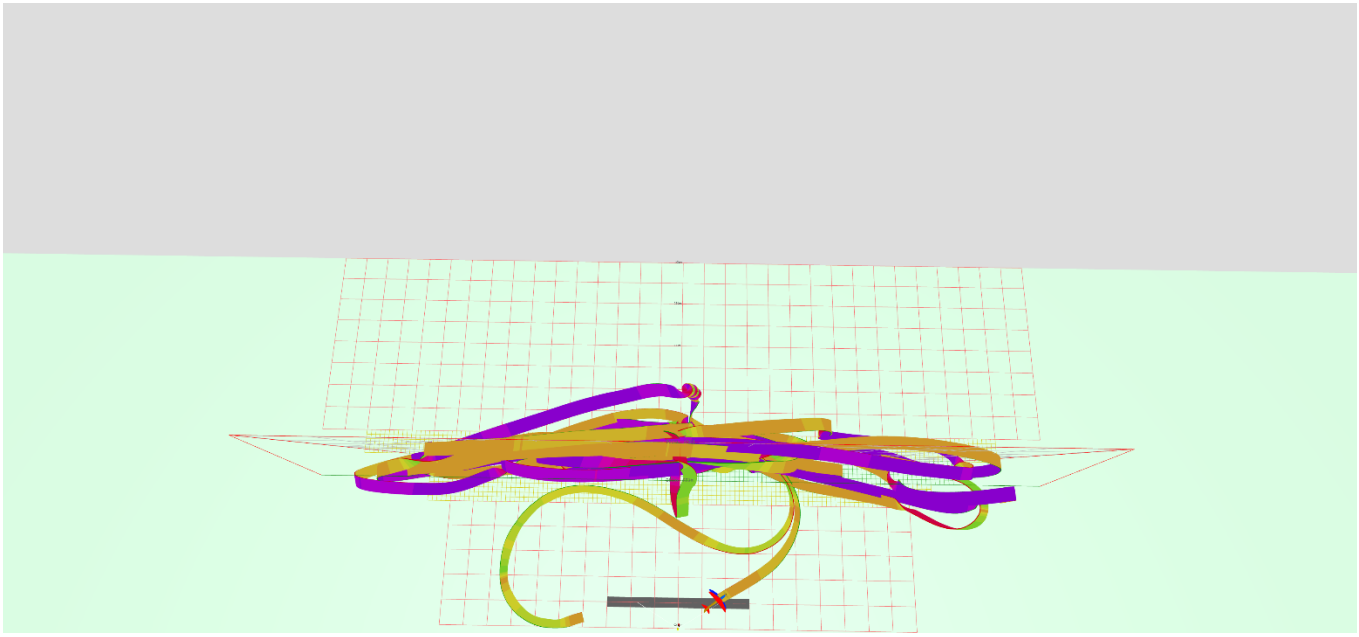
Feedback is essential to the progression of pattern skills. It's also something most pilots don't get during their practice sessions. Often the only feedback is the scores received in competition without any indication of what resulted in downgrades. So most of us practice what we perceive to be correct and hope that we're on the same page as the judges. Often that's not the case!

Lots of effort has been put into judge training and certification over the years. Rules have codified how maneuvers should be flown and what criteria is to be applied when judging. As pilots man the judge chairs, this information influences an individual's flying to some extent. Yet most pilots practice without a coach as finding someone qualified willing to observe, even occasional, flights is difficult. Getting specific feedback on individual maneuvers after a flight is extremely difficult.

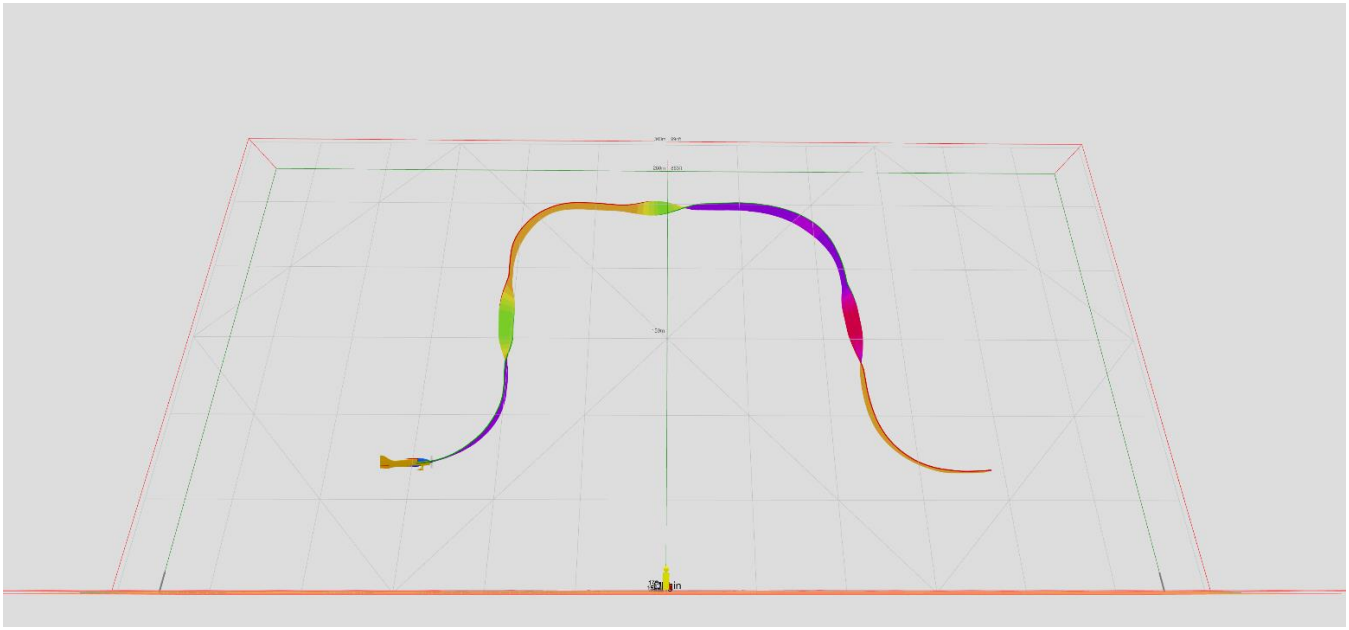
Enter Flight Coach. A small device in the airplane records a flight in detail onto a microSD card. The device contains GPS, compass, and baro sensors that record position, speed, and altitude. Inertial Measurment Units (IMU) record movements in pitch, roll, and yaw. A computer app Flight Plotter (flightcoach.org) translates the data resulting in a ribbon diagram of an entire flight. P23 looks like this:



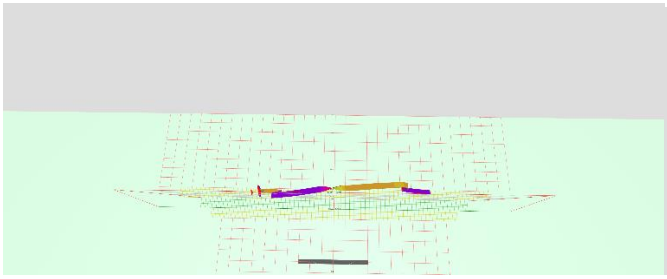
The airplane icon will fly through the sequence and the ribbon changes color with roll orientation. Obviously not easy to follow – but hang on!



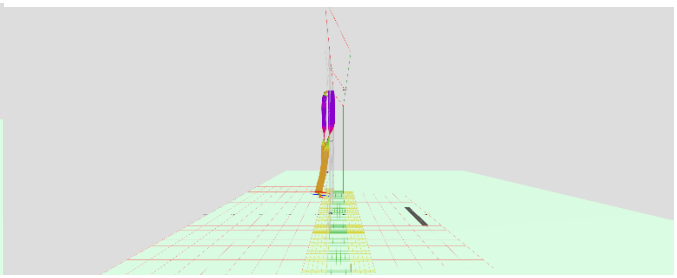
First let's take a look from the top view. The green panel is 150m, the red 175m, and each grid box 25m. This provides info on both distance and track.



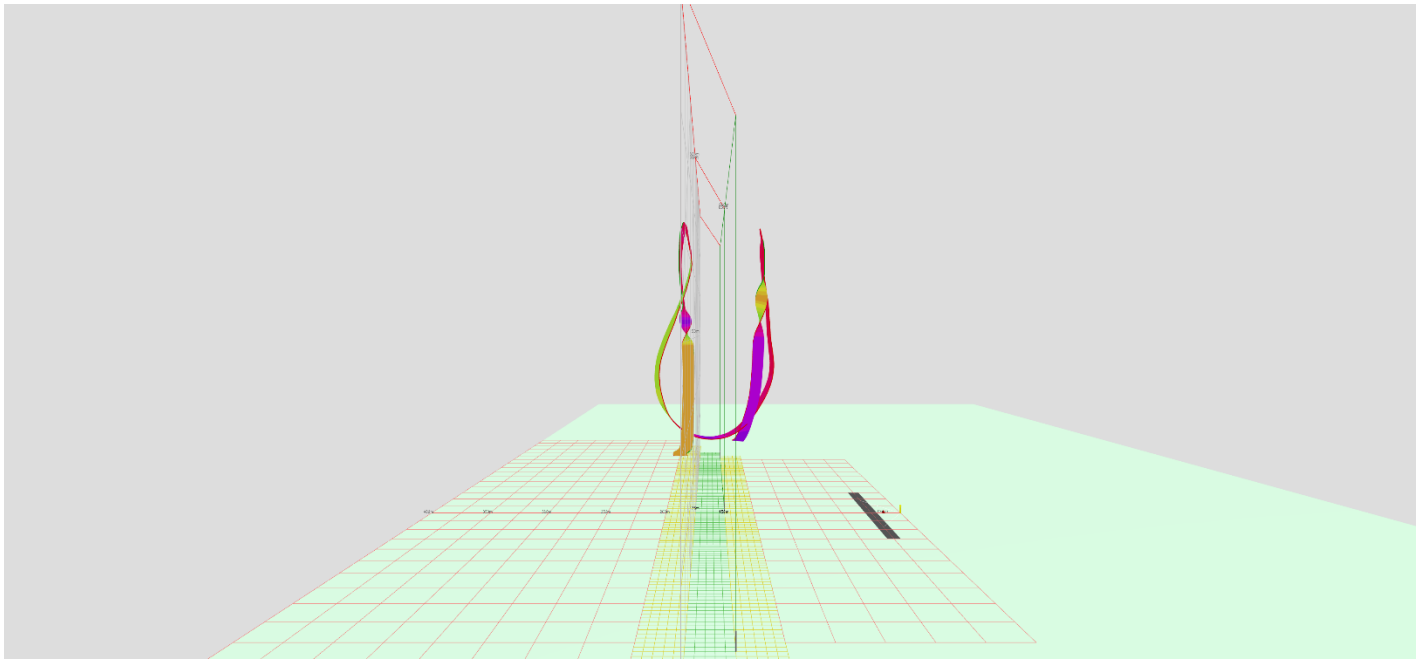
The real beauty is that each maneuver can be displayed individually! Both Mid View for true geometry and Judge View (shown) for judge perspective are available. Now it's easy to see how radii compare, centering, vertical track (actual track, not attitude), entry/exit altitudes.



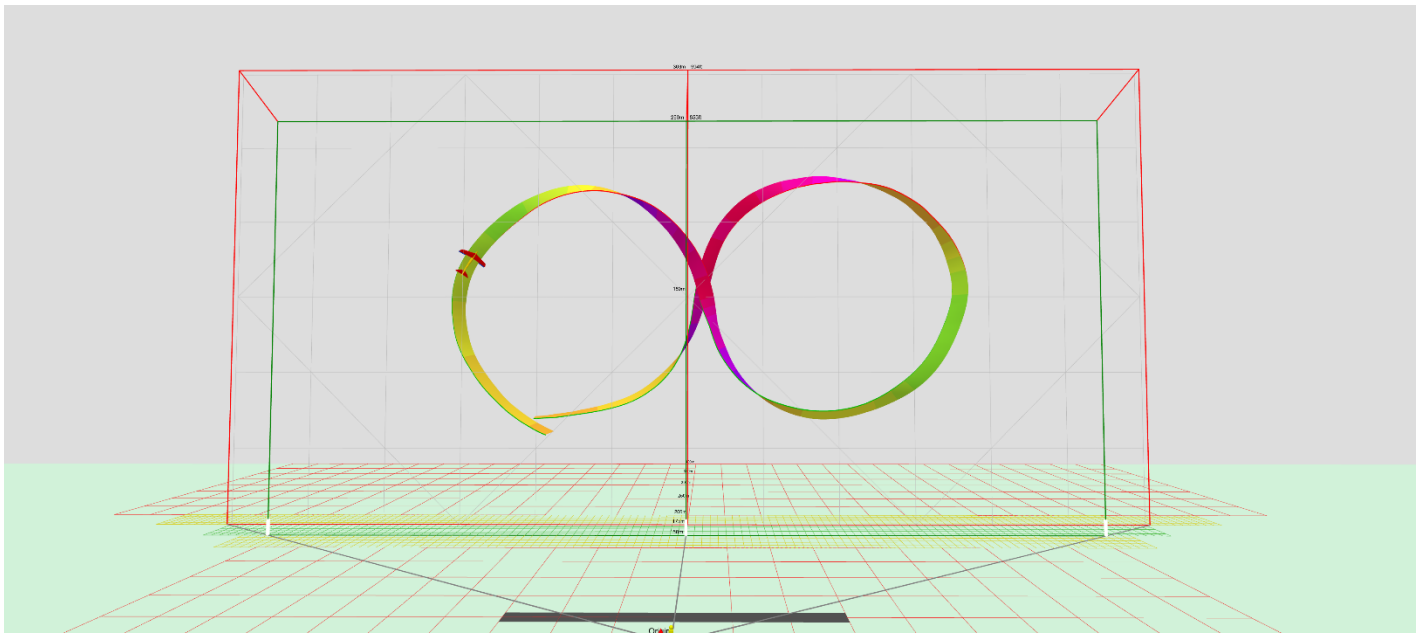
Same Top Hat from above.

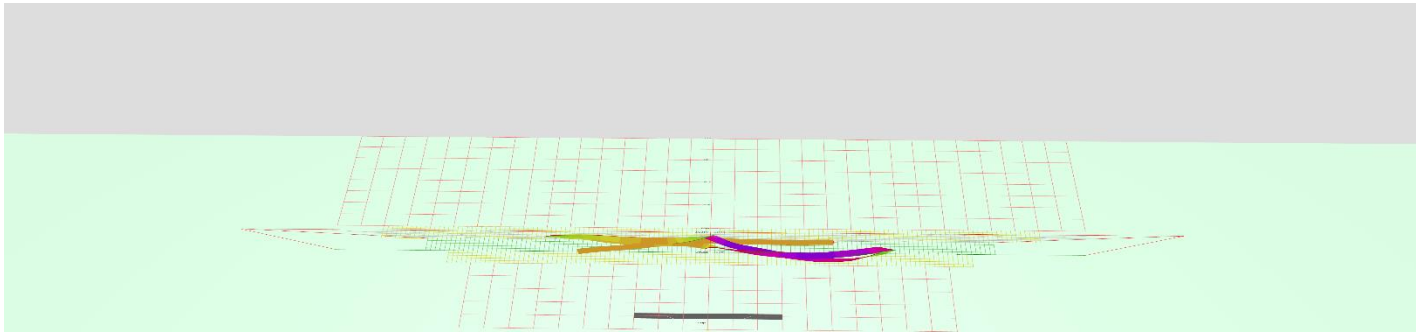


And from the side.

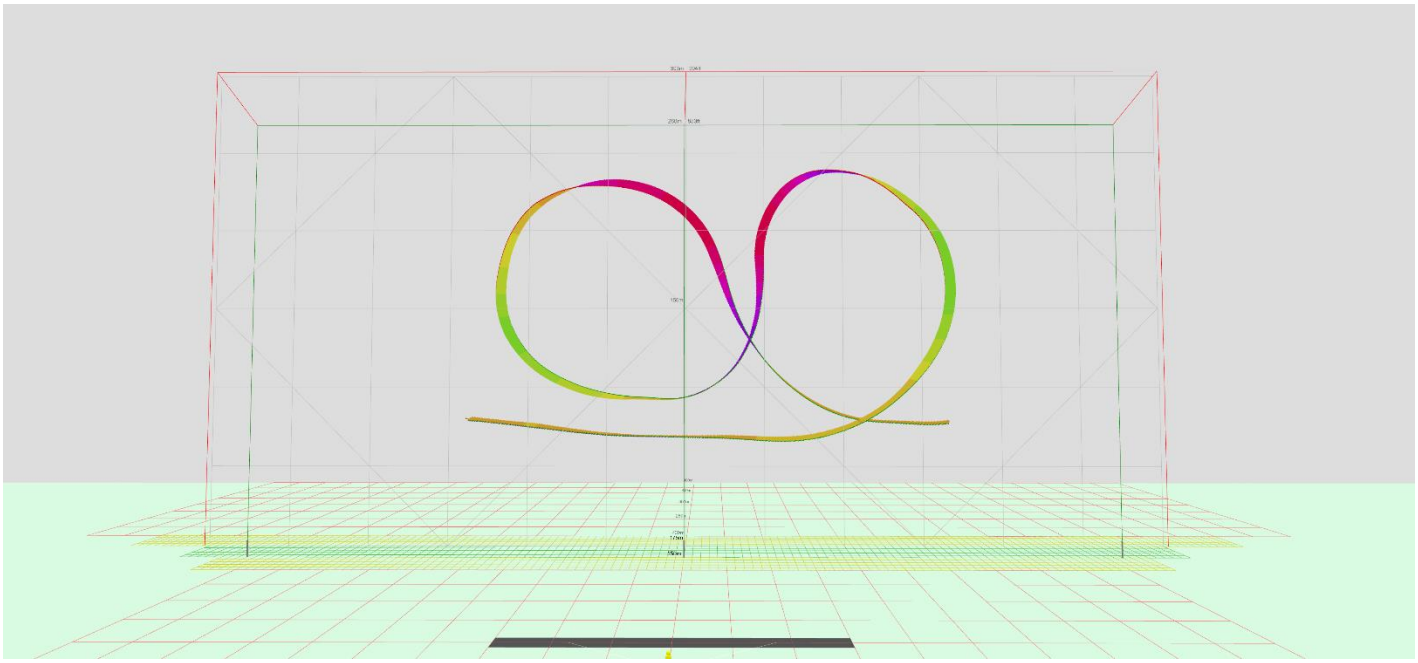


A P23 cross-box M from the side.

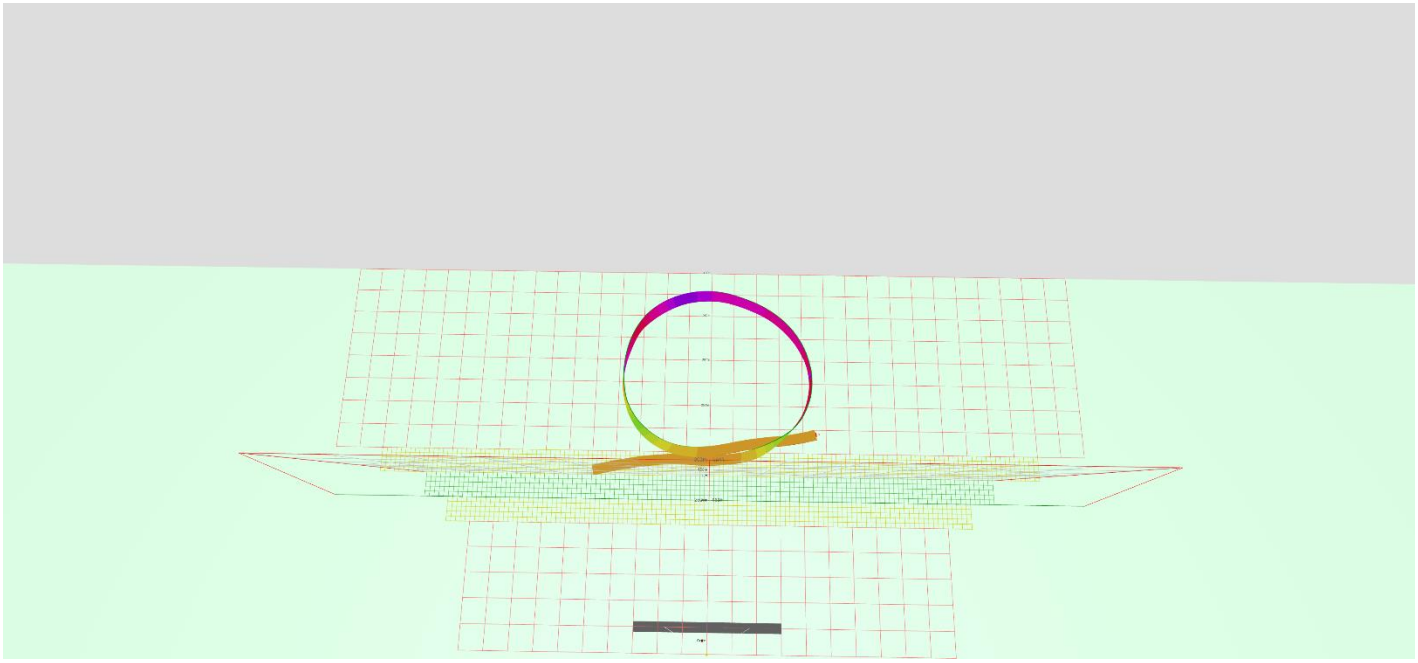




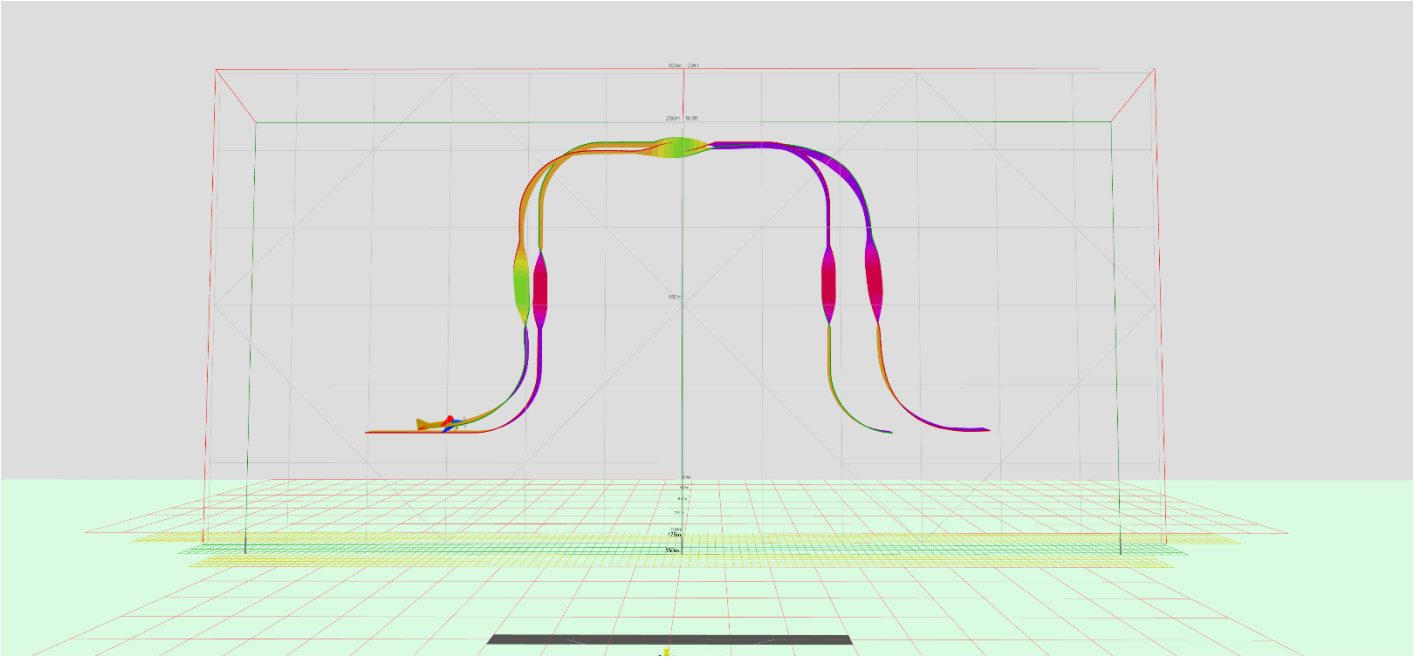
How about the Horizontal Rolling 8 from F23, front and top.



Or more typical?

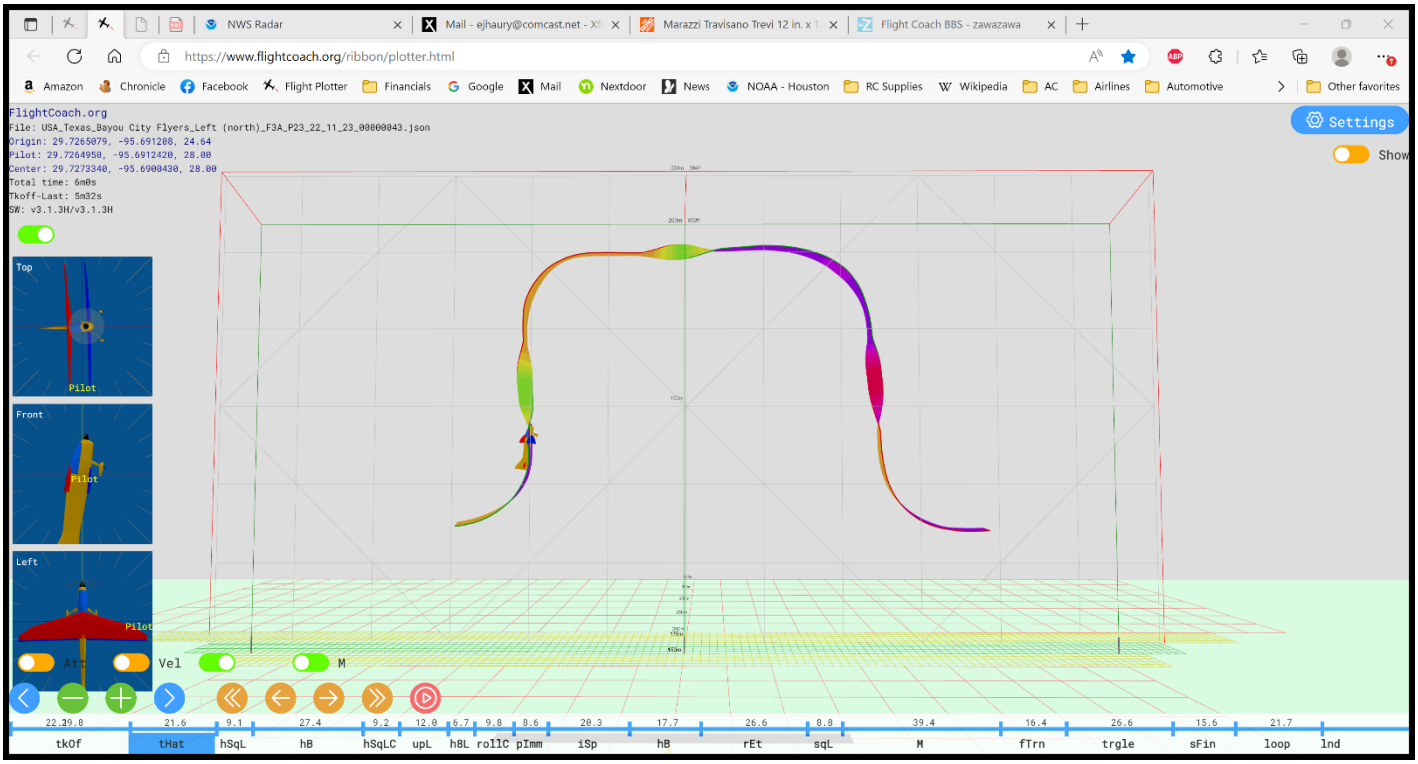


A roller from above.



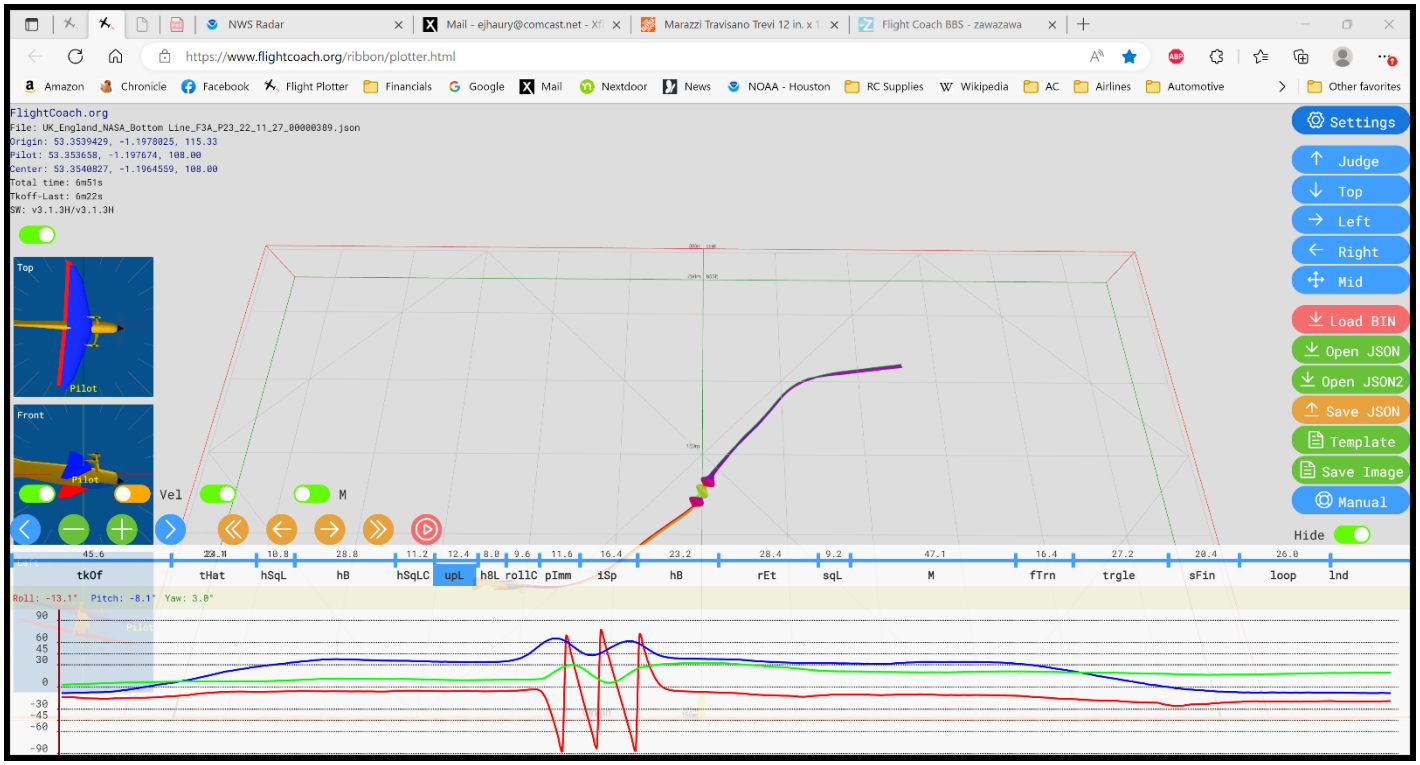
Every maneuver can be scrutinized and there's even a template of a correct maneuver for comparison as seen here.

These static views are only the tip of the iceberg! Pitch, Roll, and Yaw (PRY) data are available through each maneuver and may be displayed dynamically or in stop action. In this screenshot the images on the left depict the PRY of the airplane stopped just before the first quarter roll of the Top Hat upline. Note the P attitude to compensate for wind.

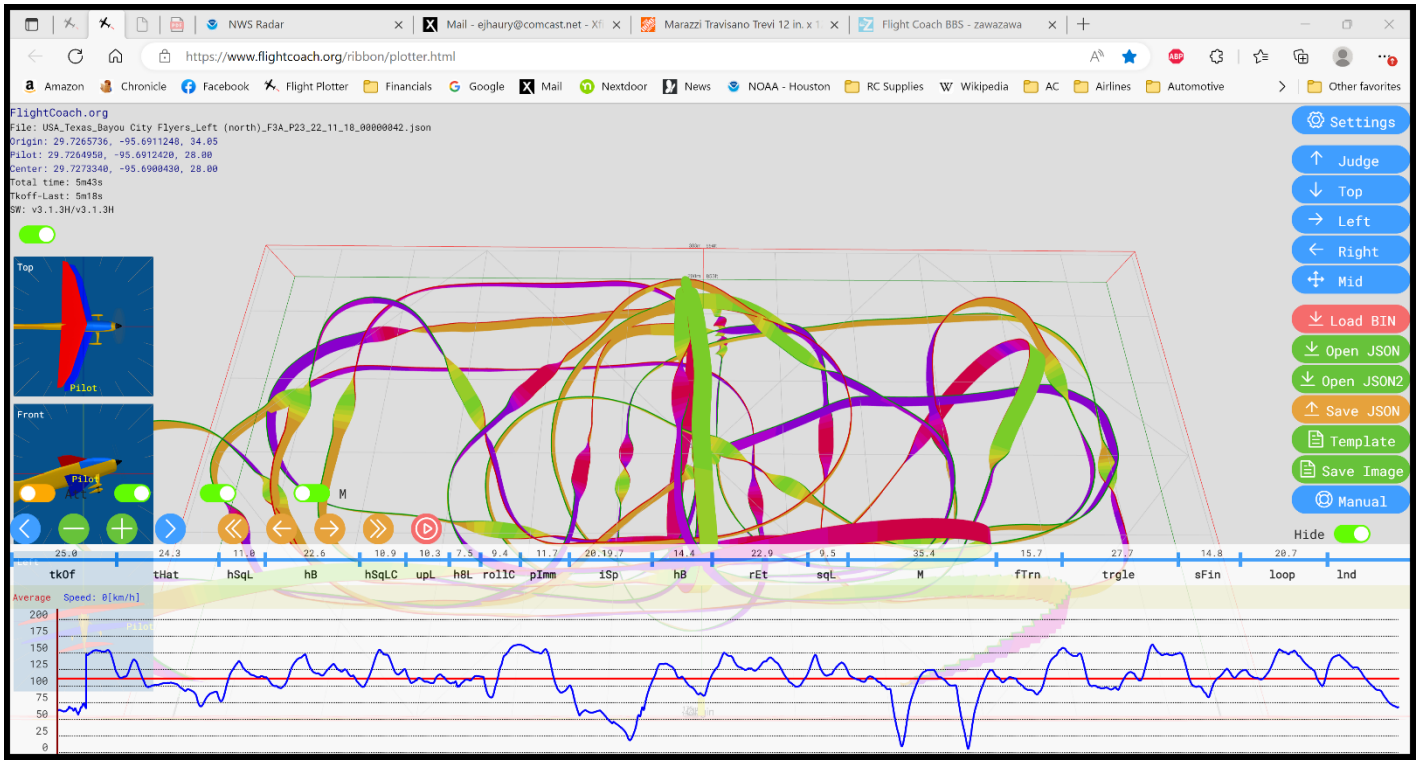


Curious about your snap rolls? The attitude images displayed as the airplane moves through a snap will leave little doubt. Want more data on a snap? Turn on more data on the bottom of the screen. Hmm- not much pitch or yaw evident.

A snap that leaves little doubt! Definite pitch before roll and obvious yaw throughout.



Interested in speed? Constant speed? Right!



All this and more. If the coordinates of the pilot station and center pole are entered into the Flight Coach database your location will automatically be entered for each flight, a real timesaver. Total flight time is recorded as is Take-off to end of last maneuver as well. The plotter runs from your browser cache, so no internet connection is needed. It will run just fine at the field from an iPhone, iPad, or PC. For the phone/iPad a microSD card adapter is needed. [Amazon.com: SD Card Reader for iPhone iPad,Oyuiasle Trail Game Camera SD Card Viewer,Cameras SD Reader with Dual Slot for MicroSD/SD,Photography Memory Card Adapter,Plug and Play : Electronics]

Trimming applications? Sure, PRY data are displayed in 0.1 deg. increments making for the best tool ever to set downline mixing (Check out the Jan K-Factor article.) or knife edge pitch/roll or whatever. Super useful for checking effect of trim changes at the field.

I won't go into system details as there's a lot of info available. [Flight Coach | Groups | Facebook] and [Flight Coach BBS - zawazawa] The system is based on repurposed drone controllers and an app that displays flight data. Comprehensive details of what and how are available at: [Flight Coach] The development team have done a superb job on this project and continue to add features. Initially, hardware was hard to obtain and there was definitely a learning curve. Systems could be built from parts, but not easily. Systems are now becoming more available with the Pathfinder unit being popular. Jason Arnold at Precision

Aero Products is selling a turn-key unit, The Precision Black Box, as well, available for North America exclusively at CKAero.

I've been involved in pattern for quite a while and this is the most powerful tool ever! BE WARNED, your flying is not as good as you think! Info gathered with this system can be BRUTAL to one's ego. However everyone can now have access to a "coach" which will likely improve scores.

There are plans being laid to use the Flight Coach as a judge training tool. The process will likely involve recording a flight which is scored by a set of student judges. The flight will then be displayed and scrutinized on a big screen with defects discussed and compared with scores awarded in real time. I've recorded quite a few of my own competition flights and compared the record with the awarded scores. My assessment is that the judges are pretty good generally. Typically some errors are missed, resulting in a higher score than deserved. Suffice to say that this data is consistent with judge performance and can only make the judge pool better.