Sky Sailing Cross Country Mentoring

In order to get the most out of a dual XC flight in Sky Sailing's Discus XL, we want to cover some of what you might expect to learn and experience.

In addition to this document please refer to the Duo Discus Sky Sailing Breifing provided on TheSoaringPage.com under Proficiency and Adding Skills > Glider Checkout Infor

Positive Experiences

- Going XC without the anxiety of being responsible for the flight.
- High Performance glider time (loggable if you have your license)
- Improve your thermalling skills
    - Centering techniques
    - Tighter circling
    - Skipping weak thermals
    - Leaving thermals when they weaken
- Experienced XC Mentors to talk through decision points.
- Course selection
    - Convergence lines
    - Typical routes and behaviors
    - Glide angle – Quick estimations/Visual
    - Enroute planning - A, B, C, (L) plans
    - Planning while thermalling
- Lift sources
    - Reading clouds
    - Surface indicators
    - Good shapes of terrain for lift generation
    - Ridge lift techniques
    - Birds – can be marking lift.
- Determining surface winds
    - Dust
    - Ponds
    - Trees
    - Birds
    - Smells
- Landout options
    - Airstrips
    - Field identification
- Speed-to-fly practical experience - Duo Discus - No Water Ballast
    - Lifting air - 60kts
    - Neutral air - 70kts
    - Bad air - 80kts+
    - Slower is faster on energy lines by avoiding circling
- Introduction to using flight computers – Clear Nav
    - Macready settings
    - Push/Pull indicators

    - Final Glide
    - Navigation and position reporting
- Radio Usage
    - Position reporting
        - Use a reference waypoint and an exact distance
        - Most of the time, units aren't actually that important. At more than 10 miles the difference is reasonably significant, but if someone has a thermal 10 miles away, you aren't going to get there in time to use it.
        - If someone is 2 miles away the difference between nautical and statute is 1600ft. You should be looking outside for them, not at your flight computer.
    - Good radio habits (Concise informative transmissions)
        - N #, or Contest # (N678GB), 7500 feet, 11 miles South of Granite Mountain, Northbound
        - Not multiple transmissions
        - Not estimates to "that farmhouse west of those hills"
- Flying with other gliders
    - Thermal entry
    - Thermalling with one or more gliders
    - Team flying on glide
    - Leeching - You may not be able to keep up with someone due to performance differences, but you can still learn from their path and decisions and fly faster. We try to contribute to the effort by flying an offset parallel path.
- Possibly different airspace or ATC interaction
    - Talking to Control Towers if transiting airspace
    - Talking to Center if near Restricted Areas
    - Talking to Center if near high traffic corridors

Negative Experiences

- **Overload -** Information overload, sensory overload, it's common. It is why I like to brief beforehand on your goals. To stay focused on a couple of areas and let you absorb exposure to a large set of other information without trying to grasp every aspect.
- **Frustration** - You're going to be flying a new and different ship compared to anything you may have flown in the past. Quieter, different pitch and roll characteristics, different sight picture. You may feel as though you don't know how to fly, especially with a coach calling out flaws in technique.
    - Common Challenges leading to frustration – Your instructor/mentor will be constantly reminding you about these:
        - **Managing airspeed and pitch.** It's a different sight picture, but the glider will react to the appropriate pitch attitude with the right airspeed. Eventually. Fly the pitch, not the airspeed;
        - **Flying too fast in thermals** - Especially from the back seat, the sight picture might seem very nose high. That combined with a lack

of wind noise compared to a 2-33/1-26 and you will likely be flying too fast.

- **Flying too slow on glide** - You probably are not even used to accelerating on glide between thermals when flying club ships. This is a common mistake, rolling out of a thermal at 50kts and not accelerating, maybe even slowing if the trim is way back for thermalling.
- **Excessive Pitch Input** - small pitch attitude changes yield fairly significant airspeed changes eventually. If you're 5 knots slow on glide, you don't have to drop the nose 10 degrees to accelerate. Maybe just 1 or 2. It may feel like just pressure on the stick puts the glider into a slightly faster or slower pitch attitude.
- **Indecisiveness** - If it seems like a really good thermal, you will need to decide to take it before asking if you should take it. If you're wrong, I'll say "no, no, no Keep going" or something like that. At 70kts you'll be 200ft into the thermal before it even registers on the vario. Think about it for a second or two and now you're 400ft into the thermal. Start to slow and roll the glider and you'll have covered another 400-500ft before establishing a 45 bank. If you don't roll hard and fast, you'll be setting yourself up for a 1300ft diameter circle which just isn't tight enough.
- **That damn mentor** grabbing the stick and moving it just before I was going to. When it is critical, I am going to help on the controls. If you aren't managing pitch and we are at risk of losing the thermal, I'll help you control pitch deviations before they are too extreme. It's also an effective mechanism for indicating which way I want you to go, a gentle pressure or nudge to the right or left to indicate the cloud or track to take. If I want the airplane entirely I will say "My Airplane" and we will go through a positive exchange of controls.

- **Airsickness** - when you aren't the one flying, especially in small ratty thermals, it is easy to get airsick. If you start to get airsickness, it might help to **lightly** hold the stick when you aren't flying. It will give you some input prior to the ship moving so your brain stays a little ahead of things.
- **"Poor" Performance** - There is a very strong likelihood that we'll be flying with other top pilots and trying to keep up with them to fly effectively as a team. You may be on your first flight in a high performance ship. They have thousands of hours of XC experience in their own ship. If the instructor pilot is helping with thermalling or glide speeds and direction, it's to try and keep up because a team flight gives more information on the air and it is more fun to fly with other pilots. Don't expect to be able to make all the right decisions and actions. We are lucky to have some of the best pilots in the country at our glider port, it takes years to get to their level.
- **Fatigue** - Unlikely that you will have been in a glider for this long trying to fly at as high of a level of performance before. It may be mentally and physically exhausting.
- **Discomfort** - The parachute may not fit ideal, the seat is too hard, it's cramped and you can't move around. It's not unusual to get out of the glider at the end of the day and

hobble for a while. It's part of the game. Sitting in the glider for a little while before takeoff to check cushions and chute support can help identify pain points.

- **Relieving oneself in a glider** - Pilot Relief might be required. Might be a challenge, might not be possible if you can't relax. A full bladder can be a safety issue. Thus a relief system will be required.
- **Unpleasant smells** – Gas expands especially if you are climbing relatively high compared to your living level or takeoff location. Avoid gassy foods as a courtesy to your mentor

Commitment to Safety

If you are new to XC flying, one can expect there will be times when you are uncomfortable with the situation we may be in. You may not have been out of glide of the launch airport before. You may have never been committed to a field landing as your only option. You might never have flown this close to terrain before.

That said, we are committed to flying in a fashion that prioritizes our safety in the glider. If you are ever uncomfortable with our options. Say something. Your instructor as a mentor, needs to be explaining all the options that exist along the way. It may be that he/she knows something you don't and it hasn't be articulated yet. Your instructor is typically thinking of Plan A, B, C, and L(anding) at any given moment during a flight.

It may be that your instructor is simply comfortable having been in a similar position many times before. But these are elements of XC flying that should be discussed regularly during the flight. The fact that the Clear Nav in either seat is independent of the other seat means you can have a different view and perhaps waypoint and your instructor doesn't know what you are seeing on your display. These flights aren't about making you a Clear Nav expert, but I'll try to outline key elements of their use.

We are a team in the cockpit and need to work together to maintain a fun and comfortable flight experience. If you aren't comfortable, say something. Your instructor can discuss why and what corrective options should be considered.

Priorities for the flight are:

1) Safety of the pilots
2) Safety of the aircraft
3) Having a fun, safe, learning experience
4) Convenience of where we land

What this means:

1) Your instructor will not ever want to put the flight in a position where there is a in danger of injury or death.
2) We are here for fun and experience. Fake internet points, bragging rights, great stories don't really matter. Legitimately scaring yourself isn't fun.

3) Convenience be damned. If we need to land out 2 hours from home in order to have a safe place to land, that's what will happen. Someone will come get us or we will hitchhike and figure it out.

Safety Margins:

We all need to fly with margins that we are comfortable with for the conditions of the flight. Your instructor's margins change throughout the flight. Factors that impact margins are landable terrain in between airports and conditions of the day and the current conditions of the flight.

Overflying farm fields that are all landable? Your instructor may be more comfortable pushing towards the performance limits of the glider. Overflying unlandable terrain? Now less than 50% of glider performance is more likely what your instructor is maintaining.

Your instructor might fly with an arrival height of 1000ft on the flight computer. If you see 20:1 required to get to a waypoint, that is 20:1 to 1000ft above that waypoint. What Arrival Height you use does not matter, just that you know what it is set to. You don't want to assume 1000ft only to find the computer using 0ft when staring down a long straight in with no margin.

The calculated arrival height depends on our MacCready setting currently in use. Your instructor should change the final glide MC to +2 for the MC you have been flying. This means that if we are flying MC 3.0 during the flight, the glide advertised to any landpoint is based on a MC 5.0 speed to fly which is about 29:1 at 87kts for an unballasted Duo.

The Safety MC Offset requires that you fully understand what it is doing on your behalf. For most newer XC pilots I recommend using a minimum of MC4.0 for a safety MC value. That will typically result in positive arrival heights while only expecting ⅔ of the max performance of the

glider. Using a Safety MC value also requires that it is not coupled to your Speed-to-fly vario. MC4 Safety MC only gives you added margin if you fly slower than MC4 speeds.

Ask questions if any of this doesn't roughly make sense.

Having briefed the above be prepared to spend most of the time looking outside to determine how our glide is going, NOT the computer! BEING ABLE TO VISUALLY JUDGE GLIDE ANGLES IS THE KEY TO XC SOARING.

How to Prepare for your XC flight

- List out **two or three** things you hope to learn or improve on for your flight. You're going be exposed to a lot more, but focusing on a few items will help it sink in.
- Talk about those items to your instructor before the flight.
- Prepare a current sectional with 30:1 glide angle at zero wind and 15 knot headwind.
- Know what angles are associated with 4, 5, 6 and 7 miles per thousand feet
- Keep an open mind and avoid a self-critical attitude about the flight. Expect some frustration and **lots** of constructive criticism.
- Get plenty of sleep leading up to the flight.
- Avoid alcohol the night before.
- Eat well before flying. Low blood sugar during the flight isn't good. Have snacks
- Bring lots of water, drink it. You may have to pee, but it's better to be very hydrated.
- Study the forecast to the best of your ability. Look at Skysight, the RASP, the NAM, values like BL UP/DOWN Max, Cu Cloudbase, HCRIT, BLTOP. Have a sense of the soaring picture so you can start to put those colors to the actual experience of the flight.
- Set realistic but low expectations for yourself or the flight. You'll have a better attitude if things don't go perfectly. They never go perfectly.
- Bring layers for clothing. 100F on the ground can still yield freezing conditions up high, especially if significant cloud cover exists. You can usually slip a jacket on like a blanket.

What You'll Do

- Your instructor will fly the launch, tow, pattern and landing, so no worries about that.
- You will take turns flying out on course. Remember the proper procedure about passing the controls: Its three statements, in sequence, between the two pilots - "I have the controls" / "You have the controls" / "I have the controls". It seems a bit odd and formal at first, but in that way, we'll have one and only one person flying at a time.
- If you DON'T want to fly at a particular point in the flight, just say so. There is no set amount that you have to fly. Likewise, in certain points of the flight, your instructor probably won't let you fly and that's OK and to be expected.
- If you're nauseous, then say so and be ready with the sick-sack. You generally have no voluntary control over this, so if you feel it coming on, don't think you're going to resist it or conquer it! There's no shame in this, and it happens to nearly everyone at some time or another when you're not handling the controls.

- Your instructor may need to take the controls from you when you are not expecting it. He/she will state “My Controls” if this is necessary. Don’t resist this, but it’s OK to ask why, either then or later.
- When you are not flying, you should be doing four things: first, looking for other traffic; second, listening to your instructor and watching how he/she is flying; third, looking for clues about our next move - cloud formation / growth / shrinkage / disappearance; other gliders; birds; dust; etc. - before we top out the thermal, be prepared to offer an opinion about what to do next; and fourth, below 3,000’ AGL, be looking for potential landing fields.
- About that traffic… Focus on calling out traffic that is pertinent and be as specific as possible in Location. “Power traffic, 1 O’Clock Low, 1000ft below, 1 mile moving right to left.” Keeping the focus on the close in distance/altitude keeps us thinking about the potential for conflict. You don’t want your instructor to be looking for traffic that is not a factor and miss the power plane coming at our 12:00 because he/she was trying to find the glider down beneath us 4000 that wasn’t a threat or of useful interest for a climb. Circling gliders nearby are always of interest.
- You will be constantly challenged to guess your arrival height at the next point in space (thermal, ridge, waypoint) etc.
- You will be challenged to guess how far away you are from clouds (lift sources), from terrain feature we are reaching for.

Landing Out

- Sometimes it happens
- If it is likely, your instructor will brief on that beforehand in order to prepare.
    - You may want to bring:
    - Phone charging cable
    - Extra layers
    - Extra snacks
- May involve a very long day/retrieve
- Keep flexible in your commitments post flight. “I have to be somewhere at 6pm is not a good plan.”
- The student is responsible for landout costs like a hotel, aero-retrieve or buying crew dinner.

  You never know where you might end up.

Post Flight Debrief

- A post flight debrief using the flight trace is important. Probably will happen in the days after the flight.
- Review thermal selection
- Course line decisions
- Errors made
- Good decisions made
- I learned ...

ClearNav II Basics

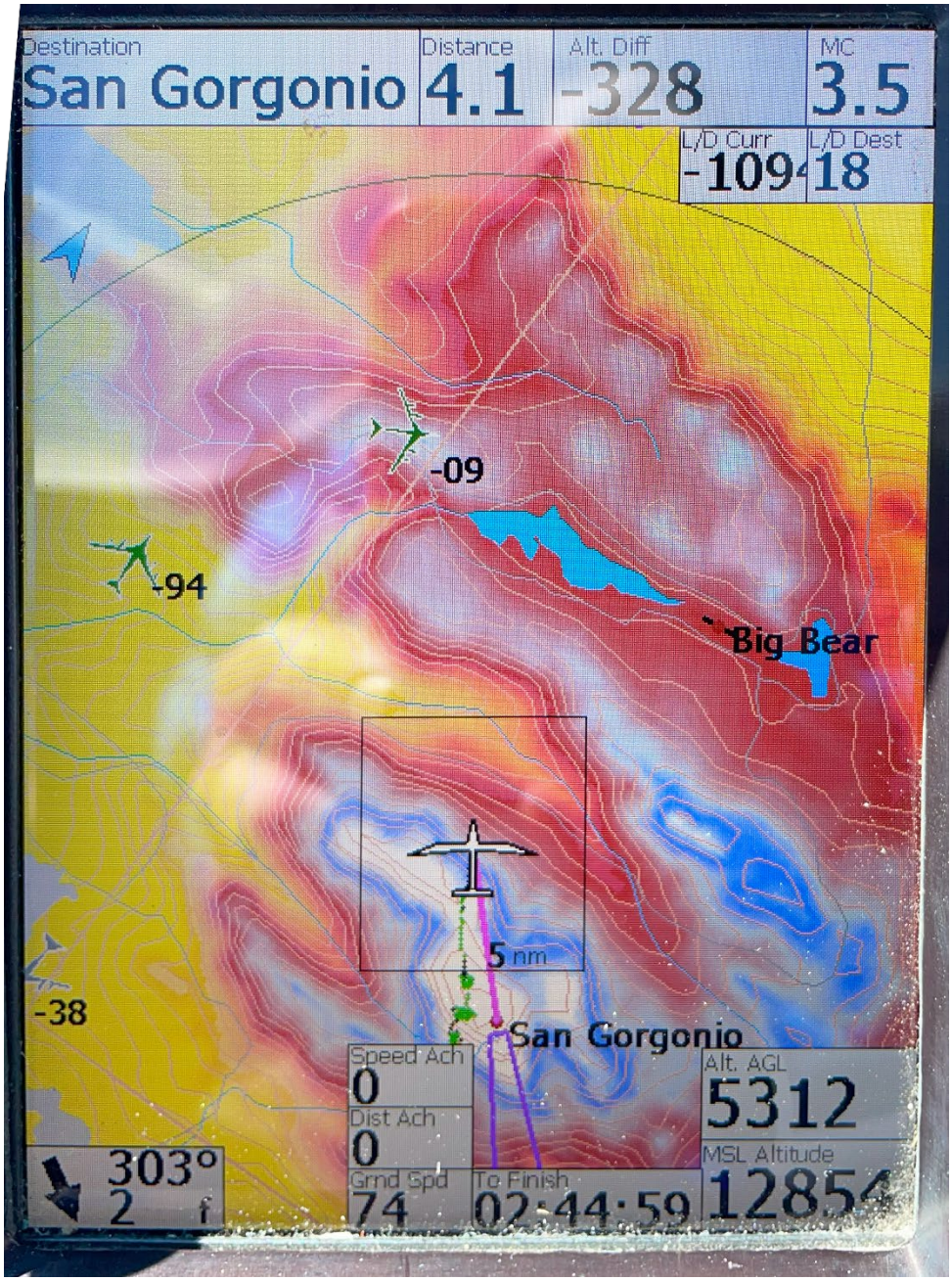
The ClearNav II moving map display is the primary navigation instrument. It has a great deal of customization that can be done and the exact configuration may be slightly different than shown below. The cursor box can be moved with the controller. The range in the lower corner of the cursor box shows the scale level – the width of the cursor box.

Refer to the Quick Reference Card at:

https://www.clearnav.net/uploads/1/3/2/0/132016676/cn-en-quickref-v4-2012.pdf

or the full manual at:

https://www.clearnav.net/uploads/1/3/2/0/132016676/cn_manual_mk3.1__edit_.pdf



Glide Amoeba

ClearNav constantly displays two colored glide amoebas that indicate the glide range in all directions from your current altitude to the AGL altitude equal to “arrival height” and the “red arrival height” setting.. These consider terrain, polar, ballast, bugs, MC, and winds. (note: winds are **not** continuously calculated)

The altitude represented by each amoeba line is selectable.

We have them set at: Purple ___TBD_____ Red ___TBD_____

An additional MSL glide range circle is drawn in all directions from your current altitude to the MSL Glide Range setting altitude. This arc (a circle in zero wind) considers: polar, ballast, bug, MC and winds. It is set at ____TBD_____

Stick Controller

The stick mounted controller is how you will interact with the Clearnav.

Zoom in and out keys change the range

Arrow and center select keys can change the focal point of the map as well as be used for making other selections.

The Menu key brings up (or hides) the on-screen menu.

The yellow “focus” key instantly returns to the map display from any other display.

Getting Information

Use the arrow keys to move the center cursor box over a waypoint or airspace item and press the select key. A small menu will pop up allowing you to select the item for more information or as a GO TO waypoint.

Menu Operations

When the MENU key is pressed, the following menu appears at the top of the screen.

Each menu item has the following functions:

 Set task options

 Allows quick selection of the next task waypoint, or the finish waypoint as the GOTO waypoint. The glider calculations are then based on that waypoint.

MC Sets the MacCready value with the UP and DOWN keys

The MC setting also affects the display of the flight track history. Green circles are plotted when the measured lift meets or exceeds the MC value. The lower the MC value, the larger the track dots appear.

 Sets the GO TO waypoint. A list of waypoints in alphabetical order is presented., with a recent waypoint at the top of the list.

Left and right keys choose the first letter of the waypoint and up and down keys select the individual waypoint by 1 row,& zoom keys by 10 rows.. Select key activates the selected waypoint as the GO TO waypoint.

 Allows selection of bug percentage. In % clean. Performance degradations are included in the calculation for buggy wings.

Up / DOWN buttons : 1% change

ZOOM buttons: 5% change

 Set the water ballast percent

Up / DOWN buttons : 10% change

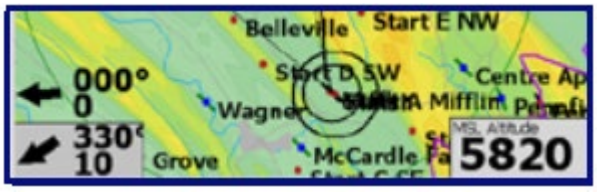
ZOOM buttons: 20% change

 Sets automatic or manual winds.

Automatic winds are calculated automatically when circling. You have to circle to generae a new wind calculation. Alternatively, the wind can be entered manually. When entered manually, both the manual wind and the automatic wind are displayed on the screen.

UP /DOWN and ZOOM keys allow direction and velocity selection

The wind is displayed in the lower left corner. If one wind is displayed, it is the automatic wind. If two wind values are displayed the manually entered wind is in the gray box and the automatic wind is above it.



The display of the wind direction is optional and selected on the Preferences screen.

Alt Sets the altimeter setting. Prior to flight, this should be set to show field elevation.

 Sets the screen brightness. A power save option is also available that automatically lowers screen intensity to LOW after 25 seconds - resets to high with any button

push.

OLC Displays On Line Contest metrics. The function will show your track, distance achieved so far and a predicted value. OLC points and triangle are also calculated.

 Selects the display of the tracks. Tracks show green circles where climbs occurred.

 Setup Menus. Options for:

- **Personal settings**. This also includes pilot names, arrival altitude, Glide Amoeba settings and SUA settings. Arrival height also sets the purple Amoeba line height.
- **Gliders**
- **Special Use Airspace**
- **Waypoints**
- **Flight Recorder**
- **Tools**

 Defines the ribbon menu items display