Toward a 20 Hour Work Week

Flying basically every other afternoon, it looks like I'll wind up logging about 20 hours in the prototype Carbon Dragon this week. The work conditions have been deplorable … almost more than one can bear! Pristine autumn air … crisp, cool, … clear. Dodging 2-3 foot corn leaves sucked into the atmosphere by big, smooth thermals. Dust devils and migrating gulls below mark columns of lift many miles into the distance with nearly unlimited visibility over the flatlands. A mile or more beneath me the earth is carpeted with a deciduous delight. Light winds aloft make it possible to move around quickly at will in any direction. Although not engaging cross-country tasks aggressively, 400-500 miles will be covered before the week's end.

The lift bank at 4000-6000' AGL has been consistent and efficient. Typically, in blue conditions, I've been able to travel in any direction, rarely circling, by utilizing something I call vertical energy in our atmosphere which is free for the taking.

Macro-lift (thermals, orographic, wave, streeting, etc) is the easy stuff. Micro-lift is comprised of disorganized burbles, disintegrated thermal fragments, and thin, string-like animals that meander through the sky and often flow into thermals like a winding stream would a lake.

Microlift is fleeting, elusive, and rapidly changing. Fully exploiting it is one of the most challenging and rewarding tasks a soaring pilot will ever address. How may it best be utilized?

Two elements form the underpinning of microflight technique. Variation in velocity and variation in heading. The basics of dolphining through variation of speed have often been addressed in soaring literature. It is important that Ultralight Soaring pilots make a distinction between conventional speed-to-fly theory (essentially speeding through inter thermal space as if it were always a homogeneous unit of sink) and flying a narrower, somewhat slower speed range (which through variation of velocity takes advantage of the minor vertical discontinuity's which exist). The latter technique is obviously better suited to negotiate microlift. The truth of the matter is that although sailplanes possess glide ratios and speed capabilities much superior to hang gliders (or ultralight sailplanes), they simply can't fly slowly enough to fully utilize microlift. It may all come together for them in strong streeting conditions, but even then pure dolphining occurs far less frequently than you might think. Actually, hang gliders are much better suited to take advantage of microlift through dolphining because of their slow speed capabilities. This does not necessarily mean that their glide ratios have reached a point which provide for frequent level flight while doing so. It simply means that they are capable to extracting the lift while a sailplane may be roaring through what feels like very light turbulence and miss the benefit of the lift it contains.

On the other hand, when utilizing microlift I have found that the 100 fpm sink and 27:1 glide of the Carbon Dragon is sufficient to frequently provide for extended level flight because of the hang glider-like flight speeds. However, variation in heading plays a critical role in producing these results. In fact, more often than not it plays a more significant role than varying flight speed. Microlift strings (another term I have coined, if you'll bear with me) are often only a wing span or so wide. They may stretch for miles but can meander widely and suddenly. The challenge is to stay centered squarely in them through sensitive, instantaneous changes in heading.

The pilot must divorce himself from any visual references on the ground and generally in the clouds above (I nearly always do best on blue days). He must acutely sense the lift differential across his wing span and constantly turn, first this way, then that, to say centered. He'll often feel a pretty good surge under a wing, something reminiscent of a thermal, and turn into it instantly by reflex … if he continues the turn as in a thermal, it'll be gone! And, as he comes back around to re-enter the string he won't find it. There's often little vertical depth to a string and he may now be below it. When feeling such a surge, its best to make a rapid, firm turn into it followed by an instantaneous correction back the other way with maybe half the firmness. Then be alert to sense the lift differential across your span and make another instantaneous correction … then another … constantly reacting … always sensing. As the old adage says, "Lift is where you find it". Follow it wherever it may go. When you think you can't work it any further, try harder. The results are often limited by your level of finesse, not ambient conditions. We're talking about a delicate high-wire routine which, if performed properly, will leave you applauding your flight! As you might expect, intuition (or probably more precisely heuristic reasoning) plays a significant role in locating and continuing with microlift phenomena.

Some degree of microlift exists in every soaring environment. Some days, it minimal. Other days, it's extensive. Its strength and consequent usage in relation to macrolift is something a pilot will have to judge for himself given the flight parameters and goals at any given time. Fully utilizing it does not of necessity impinge on cross-country tasks and at times can enhance them. Simple trigonometry will show that even when working macrolift systems, relatively large divergences from heading toward a distant goal can be justified in the pursuit of lift. Only when the angle of divergence grows to something on the order of 25 to 30 degrees does the divergence start to significantly subtract from total distance flown. The rapid, fleeting variations in heading which take place during microflight techniques have a minimal effect on distance flown when microlift is good and your overall course is not dramatically divergent. I often make some flight/same condition comparisons of macrolift and microlift techniques. It's surprising how often you can do as well or better with microlift in the Carbon Dragon, especially when penetrating against a headwind. Recently I was making such a comparison, flying the same 7 mile beat back and forth between a couple of towns and I followed one microstring for more than 20 uninterrupted minutes with a net gain of 200' in altitude. Although my heading momentarily varied as much as 70-80 degrees to either side of the course, I never turned in a circle.

I remember one day earlier this summer when we had 20-25 mph winds aloft which had to be penetrated in order to stay in the vicinity of the gliderport (I wanted to land where I took off). In spite of relatively weak conditions, microlift saved the day. Using conventional speed-to-fly, I could just stay where I wanted to, arriving back at the gliderport after each cycle with at best a modest altitude gain. After 3 cycles, I switched to microflight technique. Now, making slow headway against the wind, I returned above the gliderport at 3000' with a net 200' loss from the time I left a thermal. I was then able to gradually progress upwind and pass up all the sailplanes (including a 19m open class ship many miles ahead) while gaining altitude, all before the conditions shut down. Most of the sailplanes were not able to stay up that day. Again, conventional soaring wisdom would not dictate that things like this can be done. However, with the right equipment, the right conditions and the right techniques, it is being done.

Try microflight techniques. They're more ideally suited to Ultralight Sailplanes than any other type of soaring craft. I think you'll be pleasantly surprised!

Best Regards, Gary Osoba