SKYLINES

Newsletter of the Skyline Soaring Club for August, 2025

WHY WE DO THIS
John Gillespie Magee, Jr.

Oh! I have slipped the surly bonds of Earth
And danced the skies on laughter-silvered wings;
Sunward I've climbed, and joined the tumbling mirth
of sun-split clouds,—and done a hundred things
You have not dreamed of—wheeled and soared and swung

High in the sunlit silence. Hov'ring there,
I've chased the shouting wind along, and flung
My eager craft through footless halls of air ....

Up, up the long, delirious, burning blue
I've topped the wind-swept heights with easy grace
Where never lark, or even eagle flew—
And, while with silent lifting mind I've trod
The high untrespassed sanctity of space,
Put out my hand, and touched the face of God.

JULY NEW MEMBERS

Tim Moran

In July, we are inviting new members from our waitlist. Five have joined so far, and we plan on inviting more. Please welcome our new members and get to know them better when you see them at the field.

<u>Chad Ohl-Trlica</u>

Chad holds commercial pilot ASEL/AMEL ratings and has a bunch of tailwheel time. He grew up in Tehachapi, CA, and has always wanted to learn to fly gliders. He is also potentially interested in tow pilot training. Chad came to the airport in mid-July, so some of you may have already met him.

<u>Haile Cano</u>

Haile is friends with Carlos Troncoso and came to visit our operations in 2024. He is signed up for the Week of Training, so many of you will get to know him there.

<u>J Saddler</u>

J is an aviation enthusiast and photographer, and you can check out his photography on Instagram, under j.saddler.photography. He is ab initio and very eager to begin glider flight training.

<u>Jesse Berube</u>

Jesse holds an ASEL rating and is currently working on his IFR. He is interested in further honing his skills by learning how to soar.

<u>Matt Dana</u>

Matt is friends with Andrew Neilson and holds a PPL-SEL rating with tailwheel time. He would like to get his glider add-on rating, and he is also interested in towing.

AUGUST BIRTHDAYS

Kevin Barrett	8/24
Ryan Baughman	8/4
Anatol Dziadek	8/6
Robb Hohmann	8/5
Kasey Lovar	8/19
Ben Maitre	8/3
Chris Norris	8/27
John Noss	8/4
Mike Osmers	8/6
Alex Zobell	8/24

WHEN YOUR VARIOMETER IS LYING TO YOU

George Hazelrigg

We should all know that variometers differ from vertical speed indicators (VSIs), which are normally found in powered aircraft. The VSI displays rate of climb or descent by measuring the rate of change of the ambient air pressure. It typically relies on the measurement of static pressure. The variometer claims to display the rate of change of total energy, that is, kinetic energy (KE) plus potential energy (PE), typically relying on the measurement of the ambient air pressure corrected for airspeed. The K-21 obtains this measurement via the probe that sticks up on the fuselage toward the aft end of the glider. The pressure tap is in the throat of a Bernoulli tube, which results in a pressure less than ambient by an amount that depends on the glider's airspeed. Some variometers are more sophisticated, including a pitot input and, perhaps, even a GPS input, thereby enabling a range of potential "adjustments."

It is important to understand that energy is always measured relative to a frame of reference, which we often refer to as a coordinate system. It's easy to see that a change in the coordinate system can alter the measurement of energy substantially. For example, we measure PE as a function of altitude. But we could, for example, choose to use MSL or AGL altitudes as our reference, each giving a different result. The same is true with respect to speed. For example, we could measure KE relative to the glider (that would always be zero), or relative to the air, or relative to the ground. Since the variometer receives its inputs on a moving platform (the glider), its measurements derive from a coordinate system that is defined by the glider. That is, the measurements are relative to the glider. These measurements are then converted by the variometer into a coordinate system that is defined by the ambient air, namely into the equivalent of airspeed and barometric altitude, with a readout of an energy-equivalent rate of change of altitude. Key to this conversion is the inherent assumption that the air frame of reference is not accelerating, that is, it must be an inertial frame in order for the conversion to be correct.

The assumption that the air through which we are flying comprises an inertial frame of reference is reasonably good when we are at altitude in a thermal or cruising under a cloud street. But this is not the case as we approach the ground, especially if we encounter wind shear or a wind gust. The changing velocity of the air represents an acceleration of our reference frame, thereby introducing error into the variometer readout. Let's look at an example.

Suppose you are flying your final approach at an airspeed of 55 kts into a 15 kt headwind when, say, at 300 feet above the ground, you encounter wind shear with the headwind suddenly dropping to 5 kts. You are still essentially at 300 feet AGL, but your airspeed just dropped by 10 kts to 45 kts. This is sensed by your variometer, which displays a rapid and large loss of energy. This apparent loss of energy is the result of changing the reference frame because the shear layer violated our assumption of an inertial frame. If we are watching your approach from the ground, immediately before encountering wind shear your altitude is 300 feet AGL and your ground speed is 40 kts. Assuming a very thin shear layer, after encountering the shear, your altitude is still 300 feet AGL and your ground speed is still 40 kts. Relative to the ground, clearly the shear did not result in an energy loss although your variometer showed a large energy loss. In plain language, your variometer was lying to you.

If you fly into a slowing frame of reference (a decreasing headwind), your variometer will tell you that you are losing energy while you are not, and if you fly into a frame of reference that is speeding up (a reducing tailwind), your variometer will tell you that you are gaining energy while you are not. Consider that this is a plausible reason why we often "see" lift on our downwind leg as we begin our descent into a reducing tailwind. It may be that there is no lift there at all. It's just your variometer lying to you.

BOOK RECOMMENDATION

Joel Hough

"Understanding the Sky" is THE essential weather book for pilots – whatever you fly.

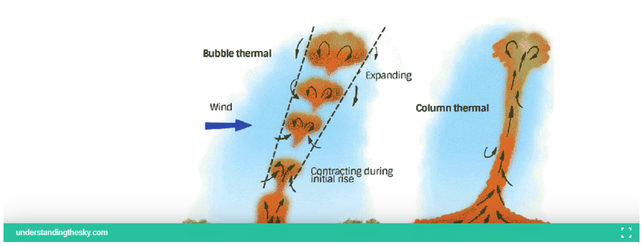
As a flyer, it's crucial you have a deep understanding of meterology, from the micro to the macro. Understanding the Sky covers it all, and having read it you will be a better informed, safe flyer, able to make better decisions based on enhanced knowledge.

Understanding the Sky will help you build your understanding of the way air flows and eddies over buildings and trees, figure out how micro-climates are created by coastal systems and mountains, and appreciate the impact of different cloud developments on flying conditions.

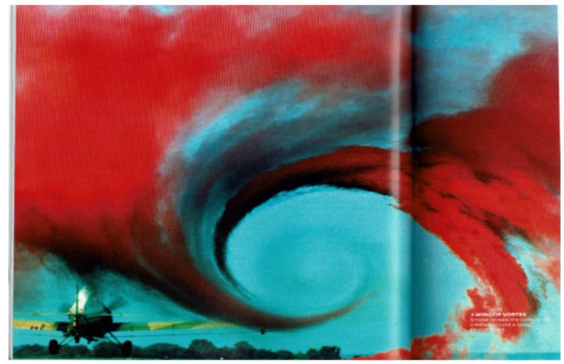
It doesn't matter whether you fly paragliders, drones, balloons, RC models, ultralights, helicopters or planes – this book hs been the best-selling classic meteorology text for over 30 years. Substantially revised and updated, and packed with clear illustrations, you will find it seriously useful. Become a wise sage of the skies.

Understanding the Sky by Dennis Pagen was updated with color drawings in 2022. The book gives an old school approach with many multi-color pictures of different flavors of lift thermal, ridge, lift and convergence. For ridge lift, graphs and drawings show the strength of lift as a factor of windspeed, steepness of ridge, concaveness of ridge, convexness of ridge, and angle of wind to he ridge.

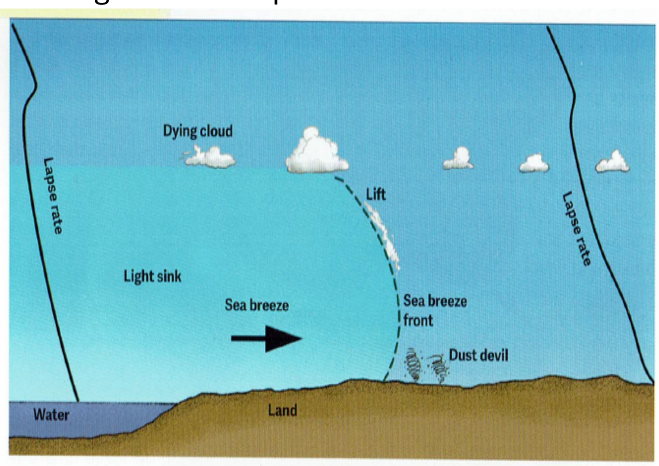
Thermal Rising



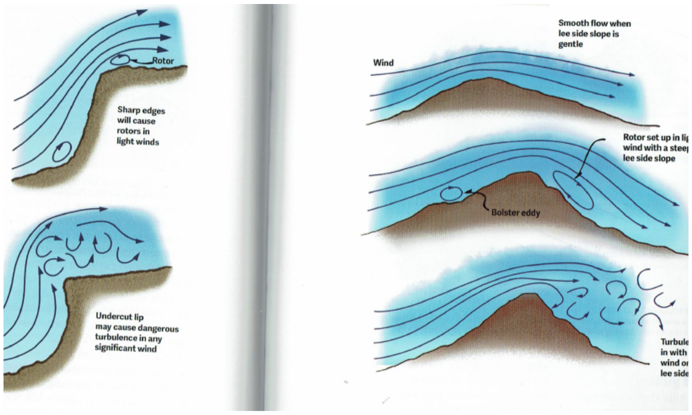
https://understandingthesky.com/thermal-rising/ was a video example of the kind of images in the book. The link no longer works. The book pictorially covers superposition where multiple factors (ridge, thermal, wave, convergence, and terrain shape) strengthen or dampen lift. For example, wave that occurs over multiple rows of mountain ranges can be in sync with the waves with stronger lift or out of sync with weaker lift.



Wing tip vortices are a reason to keep aircraft separated. One glider instructor had his home built motor glider with 450 pound gross weight go inverted with no other aircraft in sight. Some research showed up that a C-130 most likely created the wing tip vortex . My current glider club sacrificed a canopy to helicopter wake turbulence when the canopy popped open. My previous glider club had a towplane turned upside down from helicopter wake turbulence. The video https://youtu.be/tZLXMKMgnS8 shows a SEL crashing from helicopter wake turbulence.



▲FIG. 126: THE SEA BREEZE FRONT
A sea breeze provides several sources of lift, including the production of convergence lift and a sea breeze front.



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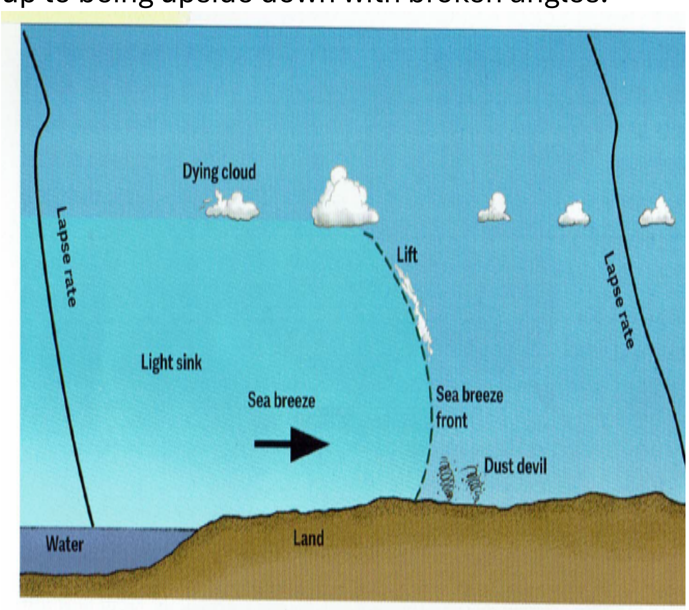
One glider friend accidentally found himself blown over to the lee side of the ridge. I suspect a rotor like the one on the middle and far right may have given him too much sink to avoid a tree. One wing hit a tree, the other wing sped up and put the aircraft inverted. The glider crashed through the trees and the pilot was temporarily knocked out, and woke up to being upside down with broken angles.



▲FIG. 126: THE SEA BREEZE FRONT
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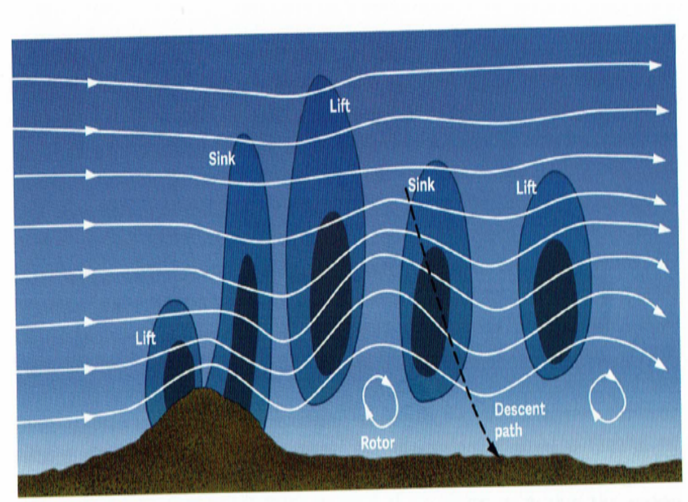
Dust devils can cause significant damage to airplanes, even leading to accidents, and have been a contributing factor in over 170 aviation accidents investigated by the NTSB since 1982. While often appearing harmless or even invisible, these rotating columns of air can be as powerful as tornadoes and waterspouts, especially at low altitudes, causing sudden loss of lift, uncommanded roll or yaw, and ultimately leading to substantial damage, including wing and fuselage damage, and even nose-overs.

The club I sailed at had a 22 keel sailboat heeled over on the side, and a nearby boat with 2 fisherman was capsized.

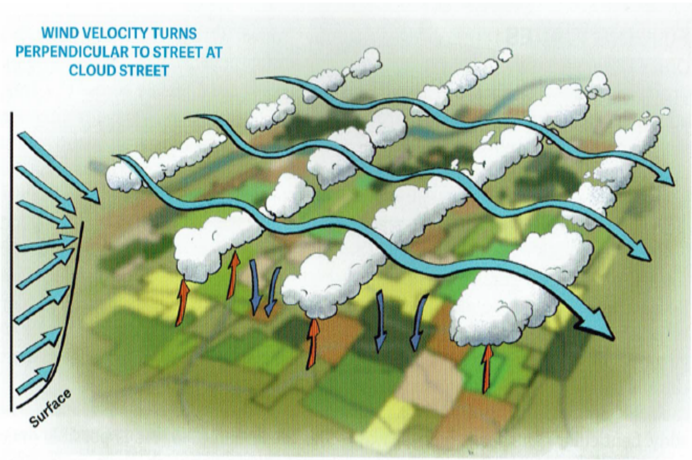
I believe I have seen an air devil going through a forest violently shaking a circular group of trees along it’s path.



▲FIG. 154: LIFT AND SINK AREAS IN A WAVE
The areas of lift and sink in cross section. The wave action at the instigating mountain does not extend very high compared to the lift in the succeeding downwind crests.

Can wave rotor destroy an aircraft?
Yes, a wave rotor, particularly associated with mountain wave turbulence, can indeed destroy a plane, especially smaller aircraft or gliders.

One notable example is BOAC Flight 911, a Boeing 707 that crashed in 1966 near Mount Fuji, Japan. The investigation concluded that the aircraft encountered abnormally severe turbulence, including rotor turbulence, that exceeded its design limits, leading to structural failure and the loss of all on board.

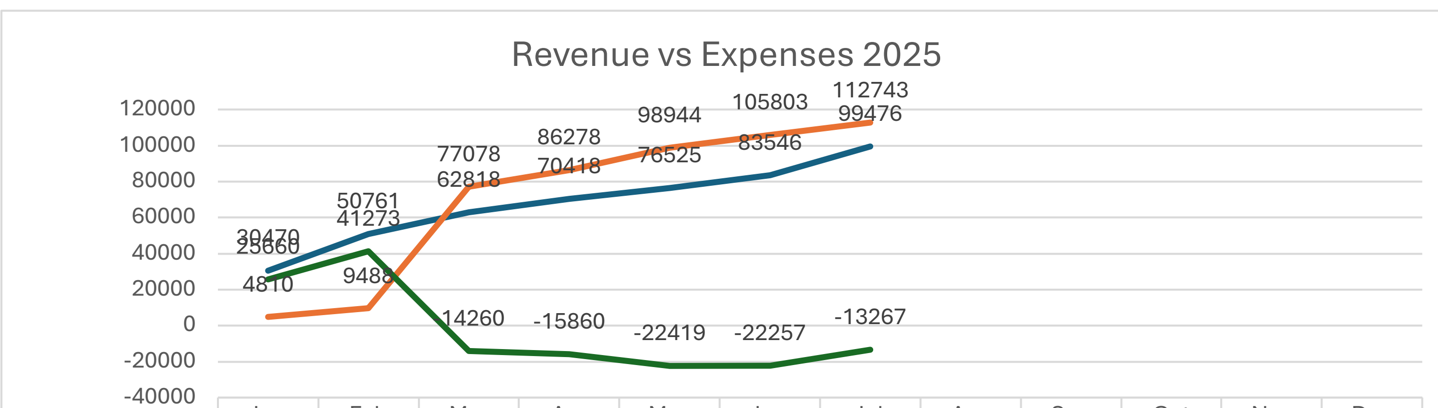


▲FIG. 155: THERMAL WAVE PRODUCTION
Lines of cumulus clouds known as "streets" can produce waves above their tops when the wind turns to cross the street at cloud level.

The cloud street is not always visible. And on the edge of the lift the sink is strong. Once I was flying a blue thermal day without any cumulus clouds to guide me. I drifted a little down wind of the airport, but had plenty of altitude to return in still air. Unfortunately, the flight path home was in a sink street over a flooded forest. My thoughts drifted from a full landing pattern, to a partial pattern, to a straight in approach. Fortunately, some lift appeared and a full pattern was performed.

Well done, Skyline! We had a good month – good weather, excellent participation – and significantly closed the gap between expenses and revenue. July 4 weekend was very good, thanks to Keith Hilton honchoing the Ad Hoc day on the 4th. Please continue to keep your skills up and fly safely in the weeks to come.

-Ralph Vawter



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Revenue	30470	50761	62818	70418	76525	83546	99476					
Expenses	4810	9488	77078	86278	98944	105803	112743					
Net	25660	41273	-14260	-15860	-22419	-22257	-13267					

Revenue   Expenses   Net

Skyline Soaring Club, Inc. is a private, 501(c7) non-profit organization, dedicated to the enjoyment and promotion of the sport of soaring. SSC is based at the Front Royal-Warren County, Va. Airport and is an affiliate club of the Soaring Society of America. For information about the club go to www.skylinesoaring.org

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