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El Paso Soaring Society

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Features:

High above the Franklin Mountains after climbing in Mountain Wave.

Winter is Mountain Wave Season

As most of you already know, El Paso is an amazing place to fly gliders! We have year-round soaring, with some of the strongest summer thermals in the world! But that is only half of the story…

El Paso has some amazing winter soaring conditions, too! The Franklin Mountains are a textbook-perfect mountain range for triggering Mountain Wave lift, and winter is Mountain Wave season!

Climbing in the Mountain Wave is completely different than climbing in a thermal. The first 1,000 feet that you climb while flying straight-ahead will be enough to addict you to it forever!

To climb in the Mountain Wave requires knowledge and skill, but if you're willing to put forth the effort, you will be greatly rewarded! Most of the world's soaring records were set while soaring in Mountain Wave: Altitude, Distance, and Speed.

This entire issue of the Dust Devil Tribune is dedicated to this under-appreciated form of lift. If you love soaring, but you're a little bored with thermals, then Mountain Wave is for you!

"A cumulus cloud marks the top of our climb in the Thermal, while a lenticular cloud cheers us on as we keep climbing thousands of feet above it in the Mountain Wave!"

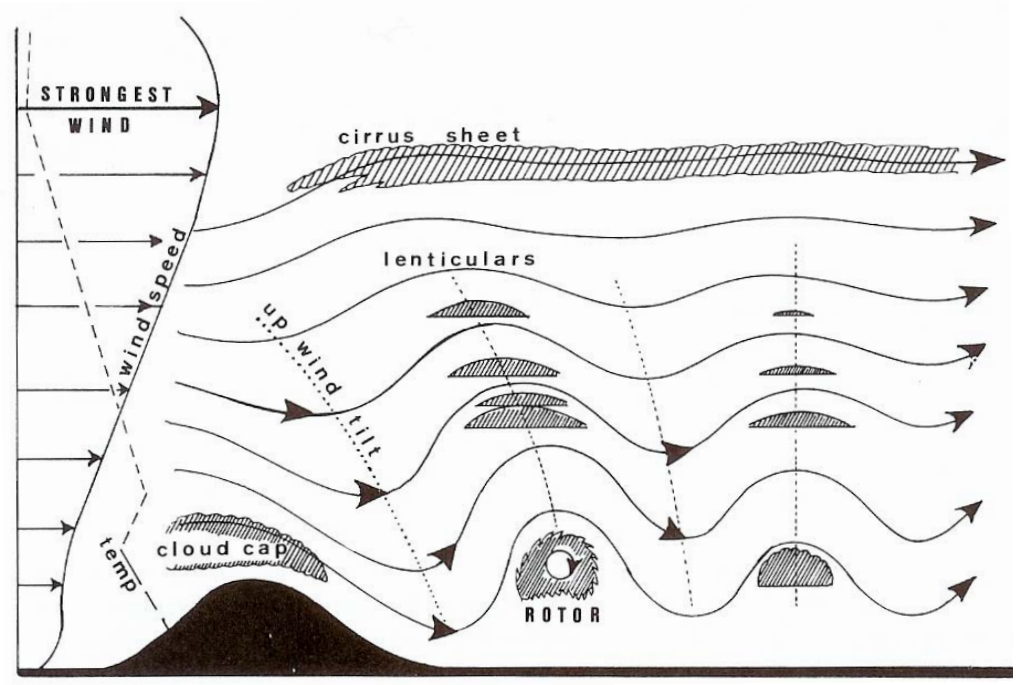
Soaring at 80 knots at 17,840 feet—and not descending!

What is so Cool about Mountain Wave?

Why do we fly gliders? While each of us has a different answer to that question, we all can probably agree that there is just something amazing about defying one of the most basic laws of nature—over and over again! After each of us experienced that very first gravity-defying climb in that very first Thermal, we each decided that this was the sport for us! Think back to that feeling you had when you first looked down and saw the ground getting farther and farther away—without the help of an engine. Now imagine getting to feel that feeling all over again—for the first time! Climbing in the Mountain Wave is all that!

Nothing you have learned about climbing in the Thermal applies to climbing in the Mountain Wave. The Mountain Wave is a form of orographic lift, while the Thermal is convective lift. That means that we don't rely on the sun for energy: We don't have to wait until noon to soar, and we can soar on completely overcast days! We associate cumulus clouds with Thermals, and lenticular clouds with Mountain Waves. But a cumulus cloud marks the top of our climb in the Thermal, while a lenticular cloud cheers us on as we keep climbing thousands of feet above it in the Mountain Wave! But perhaps the greatest difference is how you climb in the Mountain Wave: you climb while flying straight ahead! Once established in the Mountain Wave, you can lean back, relax, and enjoy the view—your variometer shows a consistent climb, and the altimeter keeps going higher and higher. Have a drink of water, or a bite of that sandwich you brought along. Say "Cheese" for the camera—when was the last time you took a picture while actively trying to climb in the Thermal?

And I didn't even get a chance to mention the peace-and-quiet of having all of the vents closed, the glassy-smooth flight, the fun of strapping on the oxygen mask, not sweating in the summer heat, and the fantastic view from 18,000 feet above El Paso, or 30,000 feet above Alamogordo!



A Cross Section of the Mountain Wave.

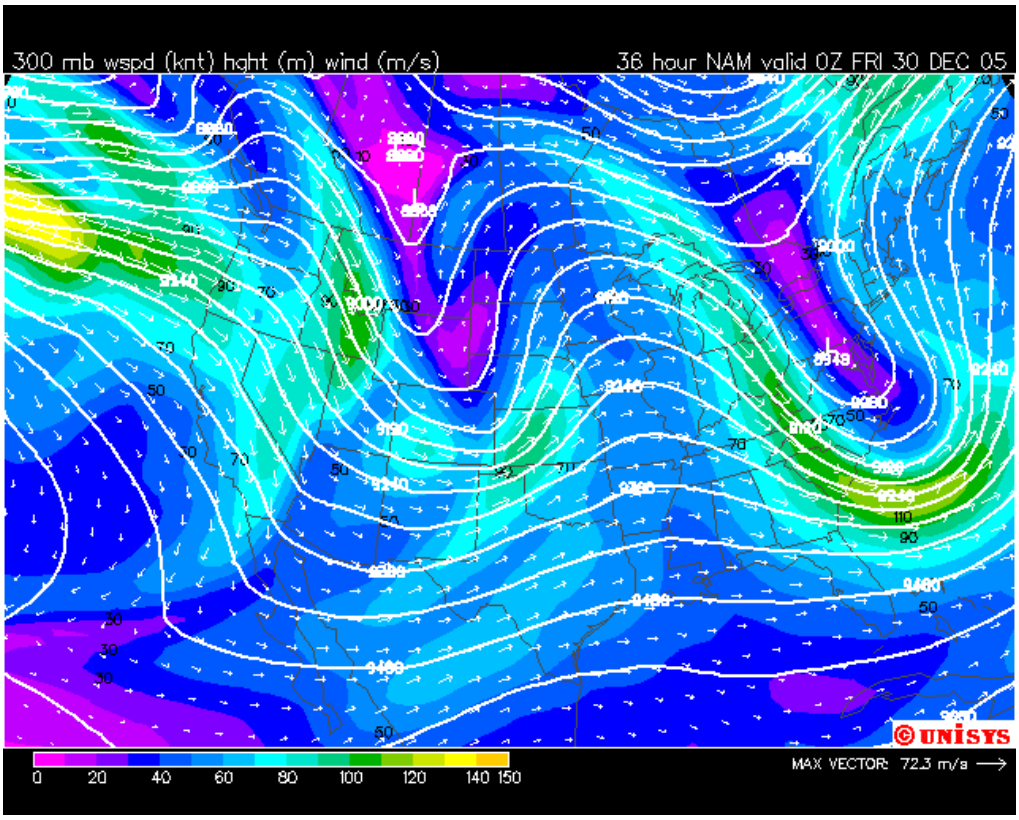
"On a perfect day, these waves can exist for hundreds of miles downwind of the mountain!"

How the Mountain Wave Works

When water in a stream flows over a rock, a series of waves form downstream of the rock. The same thing happens when air flows over a mountain. Mountain Waves are very common—they occur every day. But to get a wave like the one illustrated above requires more specific conditions.

The three ingredients needed for a Mountain Wave to form is a mountain ridge, wind blowing perpendicular to that ridge, and a stable atmosphere. As the wind blows over the mountain ridge, it descends the downwind slope (due to Bernoulli's Principle; the same law that applies to air flowing over the wing of the glider). As the air descends, its temperature increases rapidly. When the air reaches the bottom of the mountain, it is significantly warmer than the surrounding air, so it rises rapidly, starting the first oscillation of the wave. If the wind speed steadily increases with height, the winds above reinforce the winds below, allowing the wave to gain momentum and altitude. And if we are fortunate to have a temperature inversion, it will cause the rapidly cooling rising air to descend, starting the whole process over again. On a perfect day, these waves can exist for hundreds of miles downwind of the mountain!

The "lift" that we use to climb is the ascending air of the wave, upwind of the lenticular cloud. Since the Franklin Mountain Ridge is 20 miles long, the lift is 20 miles long as well. Once we establish ourselves in the lift of the Mountain Wave, we can glide 20 miles north, then back 20 miles south, staying in lift the entire time!



The 300 Millibar Chart forecasts upper-level wind direction and velocity.

"Since we always have the mountain, all we need to wait for is the wind!"

Forecasting the Mountain Wave

A sky full of puffy cumulus clouds indicates a good day for Thermals and a sky full of cigar-shaped lenticular clouds indicates a good day for Mountain Waves, but that doesn't mean that if there are no clouds there isn't any lift! El Paso is in the center of a vast desert environment, which means the air here is very dry, and lower-level clouds are not as likely to form here as they are in eastern California. If we want to climb in the Mountain Wave above El Paso, we need to do our homework.

Since we always have the mountain, all we need to wait for is the wind! We want westerly winds of at least 25 knots at the mountain top, gradually and consistently increasing in strength with altitude. By the time we reach the 30,000 foot level, the winds should be westerly, and at least 60 knots in strength. We can look at the 300mb Chart days in advance to see if the winds at 30,000 feet are expected to be near that number. If they're not, the wave won't be strong enough.

If the 300mb winds still look promising 24 hours in advance, we can get a Winds Aloft Forecast, which will give us wind data at the lower levels. If I have good winds, I launch. Yes, there are other factors like air mass stability that contribute to the wave, but if you have the wind, you will have the Mountain Wave—it's just a degree of Mountain Wave strength and height.

Supplemental oxygen is just one of many high-altitude considerations.

"Gliders are authorized to climb above 18,000 feet above Alamogordo, after following the proper procedures with Air Traffic Control."

Climbing in the Mountain Wave

For most of us, the most attractive part of soaring in the Mountain Wave is the climb. Mountain Wave offers us the opportunity to climb higher than any other form of lift. Above El Paso we are limited to 18,000 feet because of the Class A Airspace, but the lift would easily carry us much higher. Gliders are authorized to climb above 18,000 feet above Alamogordo, after following the proper procedures with Air Traffic Control (ATC).

To climb in the Mt. Franklin Mountain Wave, we first must find the lift. If the winds aloft are from the west-northwest, the wave may be found directly above Horizon Airport, but if the winds aloft are due-westerly, we need to venture north to make contact (Going north requires approval from ATC). The most common place to find the lift is between Highway 375 and the eastern limit of Horizon Airport. If you find yourself in strong sink, you are in exactly the wrong place—the lift is both about three miles west, and three miles east of you. Correcting by flying upwind is generally the safer bet, but it requires you to aggressively accelerate to 80-90 knots to bridge the gap to the lift. Correcting downwind is risky because you may not have enough altitude to make it back to the airport—even though you may be just one mile away!

Once you find the lift, point the nose of the glider directly into the wind, and slow to your minimum sink speed. Then, look down to the ground and attempt to get your glider to remain stationary above the ground. Yes, even though the winds aloft may be blowing at over 40 knots,

Climbing in the Wave (Continued)

the actual wave remains motionless in relation to the ground! So, in a perfect world, maneuvering your glider to remain stationary will allow you to remain within the lift! If you can't get your glider's groundspeed down to zero, gently fly S-Turns to maintain a north-south track over the ground. *Do not* try to circle in the wave! Your glider's 40 knot airspeed plus the 40 knot wind speed will blow you helplessly downwind of the lift, and right into the strongest sink God created!

If you lose contact with the wave, and you don't know where it went, first attempt a correction directly into the wind. Accelerate aggressively to penetrate the headwind (verify by looking down to the ground and see if you're moving forward), and wait to see if contact with the lift is made. If you find strong sink instead, the lift is behind you. Turn your glider 90 degrees left or right, and slow to your minimum sink speed. Let the wind blow you back into the lift. After you find the lift, but before you turn back into the wind, feel free to see if even stronger lift exists just a little farther downwind—but don't venture too far—God's smite is waiting for you!

Once you've reached the top of the wave (or 18,000 feet), start surfing the wave! Fly north-south ground tracks along the length of the Mt. Franklin Ridge. But remember: the strong winds aloft will require a significant crab angle into the wind to remain in the lift—just like lining up on the runway with a strong crosswind.

"Even though the winds aloft may be blowing at over 40 knots, the actual wave remains motionless in relation to the ground!"

Strong crosswinds require large crab angles to remain in the lift.

Lenticular clouds announce the arrival of the Mountain Wave.

Mountain Wave Training is Available

Flight Instruction isn't limited to getting your pilot's certificate. Why stop your training when the hardest part is over? Once you get your pilot's certificate, the best of this sport is at your fingertips! You've learned how to glide, now learn how to soar! Whether you want to transition to higher-performing sailplanes, start soaring cross-country, or climb in the Mountain Wave, jump at the opportunity for advanced flight instruction! It's free, and it can be counted towards your next Flight Review!

As you now know, climbing in Mountain Wave is an entirely new dimension in your soaring skills. There are many subjects that should be addressed before you make a serious attempt to climb in the Mt. Franklin Mountain Wave. Preflight preparation includes fully preparing the glider and yourself for the climb, days in advance! The oxygen bottle needs to be filled, the oxygen mask needs to be installed and checked, the glider's battery needs to be fully charged, and the radios need to work perfectly. You need to have the proper clothing, and you need to make sure that you can fit in the glider and manipulate all of the glider's controls while bundled up, and wearing the parachute.

Finally, the Mt. Franklin Mountain Wave is directly above El Paso International Airport. Proper communication with the Air Traffic Controllers can make or break an attempted climb in the wave. Climbs above 18,000 feet at Alamogordo require approval from several controlling agencies, and pilots must be checked-out on those procedures. What are you waiting for? Winter won't last forever!

"Proper radio procedures with the Air Traffic Controllers can make or break an attempted climb in the wave."

THE
OFFICIAL NEWSLETTER
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EL PASO, TEXAS

THE DUST DEVIL TRIBUNE

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EL PASO SOARING SOCIETY

WE ARE LOCATED AT HORIZON AIRPORT, ON PELLICANO STREET JUST EAST OF LOOP 375. WE NORMALLY OPERATE ON WEEKEND AFTERNOONS, AND AT OTHER COORDINATED TIMES. PLEASE CONTACT ANY OF THE BOARD OF DIRECTORS FOR MORE INFORMATION.

Current Club Rates as of January 1, 2006

El Paso Soaring Society Rates	
Introductory Ride	$75
Club Dues	$40/mo.
SSA Dues	$64/yr.
Tow	$150/hr.
Grob 102/103	$15/hr.
Schweizer 1-26/2-33	$10/hr.

White Sands Soaring Association Rates

Tow $30 to 2,000ft., then 75¢ for each additional 100ft.

Currently, reciprocal benefits to EPSS members at the WSSA in Alamogordo are limited to aero tows. If you do not own your own glider, EPSS club gliders may be available to you with prior approval from the Board of Directors.

Weather Resources

This month's Dust Devil Tribune included several references to weather forecasts. There are many sources of weather data; feel free to explore the different vendors to find the source that you like the best. Here are a few that I use regularly:

Unisys: http://weather.unisys.com

Dr. Jack's: http://drjack.info

DTC DUAT: https://www.duat.com

Flight Service: 1-800-WX-BRIEF

Trying to Bust *into* Prison

On November 28th, while attempting to climb in the Mountain Wave east of El Paso International Airport, I encountered very strong sink, and chose to make an off-airport landing. Fortunately, there was a suitable stretch of dirt not far away, and despite visible power lines, light fixtures, and fencing with coiled razor wire, I chose to land. Since I practice accuracy landings at the end of each and every flight, the landing was safe and damage free. What I didn't realize until my glider came to a safe stop, was that I had landed at Rogelio Sanchez State Prison! Oops! After an apologetic explanation of my intrusion to the guards and to the warden, we were able to retrieve the glider.