HANGAR ECHOES

EXPERIMENTAL AIRCRAFT ASSOCIATION
CHAPTER 168 DALLAS TEXAS

EAA's Top Technical Counselor is Mel Asberry

By Marvin Brott

The November issue of EAA's Experimenter magazine announced the fact that Mel Asberry was named *Top Tech Counselor* for the past year. A great big congratulations Mel! As the Experimenter said, "You are a great representative for the EAA Technical Counselor program." This magazine names the top 25 tech counselors each year, and then focuses a bit on the top person. There was one column outlining Mel's accomplishments in aviation and a mention of how both Mel and Ann are instrumental in the leadership of Chapter 168. A picture of Mel was also included in the article. Mel is in good company in the top 25-list, since number two on the list was Tony Bingelis from Austin.

The top 25 rating is based on an activity point system with points awarded for the number of inspections, presentations, articles published, phone calls answered, etc. Mel had 340 points to Tony's 296. Third place had 155, fourth place had 97 and the 25th had 86. A fairly sharp curve at the top. It could be that Mel received a lot of points just off the phone calls from Mac Cobb and myself. Just kidding. Our chapter is the first to realize that Mel has worked hard to achieve this recognition with the many inspections of our projects. Sort of reminds me of all the help that Dick Cavin gave us in earlier days. Besides being a Technical Counselor, Mel is also a Flight Advisor and DAR.

Also, at this time I would like to congratulate all of our Tech Counselors and Flight Advisors in Chapter 168. This is Volunteerism at it's finest.

While trying to find a photo of Mel for this announcement, I came across one that is most appropriate since it includes both Mel and Ann. The photo selected shows them at the controls of the Spruce Goose ready for take off. Mel is sitting in Howard's seat with his right hand on eight throttles (R-4360's @ 3,000 hp each). Ann is ready to help in the co-pilot's seat. Thanks Ann for an outstanding year as president of our chapter. The picture was taken on one of the trips out to Oregon (McMinnville) for an RV fly-in.

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DESIGNATED AIRWORTHINESS REP.
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A & P MECHANIC

EAA

TECHNICAL COUNSELOR
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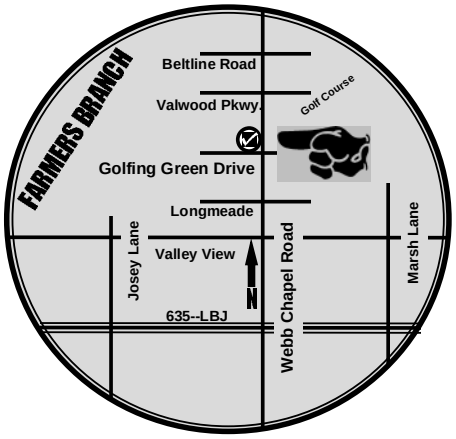
December 5th Chapter Meeting



Our December 5th Meeting will be held at the Farmers Branch Library, located on the northwest corner of Webb Chapel and Golfing Green Drive. The meeting will be held in the auditorium and will begin at 6:30 p.m. and finish by 10:00. Note that the Library has generously given us an extra hour for this special meeting.

This meeting is our Christmas party! There will be food, a white elephant gift exchange and musical entertainment again provided by Jerry Mrazek and friends. So, bring your favorite dish or dessert that does not require heating (we will not be able to heat or keep hot anything in the library). But, if cooking is not your forte, then bring your favorite munchie. A bag of chips or cookies is fine. The Chapter will provide meat, cheese and bread for sandwiches as well as the drinks.

The white elephant gift exchange will use the same format as last year. We limited the trading on the gifts to three trades, and that worked so well that we are doing it again. So bring your unmarked wrapped gift and join in the fun.

After the gift exchange, Jerry will again be playing a little bluegrass music accompianied by some of his very talented friends. This party is fun for all so bring the spouse or significant other and join in the festivities.

December 9th Chapter Fly In

The December 9th Chapter Fly-in will be to Grand Prairie Municipal Airport. We will meet for lunch in the restaurant on the field starting at about 11:00am. Come on out and experience first hand the hospitality that only Grand Prairie can provide.

Upcoming Local Events

- Dec. 3rd – Young Eagles event at Redbird 1:00pm start.
- Dec. 5th – Dallas 168 Christmas Party at Farmers Branch Manske Library.
- Dec. 10th – Young Eagles event at Redbird 1:00pm start.
- Dec. 17th – Young Eagles event at Redbird 1:00pm start.

December 12th Director's Meeting

The December BOD meeting will be held on the 12th at the Farmers Branch Library meeting room starting at 7:00 p.m. The minutes from the November 16th BOD meeting (recorded by David Cheek) are as follows:

Attendees: Ann Asberry, David Carter, David Cheek, Bo Bauereis, Ted Fontelieu, Stephen Palstring, John Peyton, Michael Stephan, Mel Asberry, Sam Cooper, Steve Genotte, Jerry Mrazek, Jim Quinn.
Meeting started at 7:00 PM

- December 5th Meeting is the 168 Christmas party and white elephant gift exchange. The auditorium will be available till 10 PM. Details of the party were reviewed and discussed.
- Possible early '01 programs were discussed.
- December 12th BOD meeting is at the FB Library.
- December 9th fly-in to be at Grand Prairie. We will use the restaurant for lunch.
- December 26th Hangar Echoes assembly will be at Ann and Mel Asberry's home.
- A BOD nominating committee was recruited. The committee will be: Bo Bauereis (lead); Jerry Mrazek; Michael Stephan. A BOD slate will be needed for the February meeting, with elections in March. The makeup and number of BOD members was discussed.
- The Young Eagles flights from Redbird on 12/3, 12/10, 12/17 were discussed.
- The policies for classified advertising in Hangar Echoes by non-members were discussed. No motion was passed. The editors were directed to use discretion in running classified ads of interest for 2-3 months without charge, space permitting.
- The Chapter library resources were discussed. The editors were asked to include a descriptive paragraph in Hangar Echoes.
- The '01 Officer situation was discussed.

December 26th Newsletter Assembly

The December issue of Hangar Echoes will be assembled at the home of Ann and Mel Asberry on December 26th starting at 7:00 PM. The address is 2464 CR655 Farmersville, TX. For directions call Ann or Mel at 972-784-7544. Every year Mel and Ann host the December folding of the newsletter, which also doubles as a Christmas/New Years Party. There is always plenty of food and good conversation. So, make plans to attend.

A Message from the President: Ann Asberry

This is my last President's Page message for my tenure as your Chapter President. I thought I would go over some of our more notable events for this past year. See how many you remember and or attended.

Monthly Fly-In:
Red Bird, Tour of the Ft Worth ARTCC, Cedar Mills, Mesquite Metro, Terrell, Galveston, Sherman Municipal, Spinks, Hicks, Lancaster, McKinney (Chili Cook-off), Grand Prairie.

Programs:
Jan Collmer, Aerobatics Performer
Jim Wilson, Aerial Photographer
Dick Flunker and Mel Asberry, Metal aircraft construction
Ed Kolano, Test flying your homebuilt aircraft
Tom Ferraro, Rag and tube building and restoring
Tom Scott, Glass Goose amphibious aircraft
Members projects, various speakers
Phyllis Moses, Speaking on Eleanor Smith pioneer aviatrix
Dick Kyte, Polen Special II
Mike Hoye, Pober Pixie II
Holiday Party

First Flights:
Jerry Bidle, CGS Hawk
Mike Hoye, Pober Pixie II
Bert Feller, Glastar
Jay Pratt, RV-6
Mark Steffensen, RV-8A
Dick Stevens, RV-6

Special Events:
March 25, Young Eagles at Midlothian Mid-Way, flew 59
April 29, Cedar Mills fish out with McKinney Chapter 1246
May 13, Aviation Day at the Library for children
May 20, Fish Fry with McKinney Chapter 1246
June 10, Overnight Fly-out to Galveston
June 17, Poker Run with McKinney Chapter 1246
June 24, Young Eagles with Sherman Chapter 323, flew 43
July 1, Young Eagles Addison, flew 5
July 8, Challenge Air Addison
September 16, Challenge Air Love Field
September 26, EAA Grassroots Meeting Addison
September 30 Young Eagles Alliance, flew 21
October 8, Young Eagles Mesquite, flew 2
October 19 – 22, SWRFI Abilene
November 11, 1st Annual Chili Cook Off with Chapter 1246

WOW! Year 2000 was packed with just about anything you might want to do in aviation. All of these events required Volunteers and Participants to make each one a success. Next year PLEASE remember that this Chapter is YOUR Chapter. It is only as good as what you put into it. I know I enjoyed everything; I hope you did too.

I wish you blue skies and tail winds

SWRFI Raffles Off a Gator

By Jerry Mrazek

The Southwest Regional Fly-in is raffling off a John Deere utility vehicle known as a "Gator". All of you who have volunteered to work out at Abilene for the fly-in have seen them running around the field. They are really handy little vehicles.

SWRFI has worked a deal with the John Deere dealer in Abilene to get a special price on one of these little gems so we can raffle it off. After all of the bad weather we have experienced for the last three years we can use any income we can get. The chances are $5.00 each and we have only printed 3000 tickets so your chances are considerably better than winning the lottery. We will hold the drawing after we have sold all of the raffle tickets. If you would like to buy one or more chances please contact Jerry Mrazek at 817-265-0834 or send him a check for the appropriate amount to the address below.

Jerry Mrazek
907 Clemson Court
Arlington, TX 76012

Jerry will mail you your stub(s) and enter your ticket(s) in the raffle. The figure below contains some information on the Gator for your consideration.

Gator ® 4x2 Utility Vehicle

- 10 hp, overhead valve, single-cylinder, air-cooled, 4-cycle gas engine improves fuel economy
- Continuously variable transmission eliminates shifting; speeds from 0 to 18 mph
- Standard differential lock helps vehicle pull through tough spots
- Standard high flotation tires minimize ground compaction, improve traction in mud, and flex over bumps for a smooth ride
- Low center of gravity enhances stability and handling
- Tight, 22-ft. turn clearance circle
- 16-gauge-steel, 10.1 cu. Ft capacity cargo box hauls up to 500 lb.
- Standard halogen headlights maximize visibility
- Compact design allows unit to be hauled in the bed of most full-size pickup trucks

2001 Officer Elections

Sam Cooper

During the October meeting the following slate of 2001 Chapter 168 Officers were elected by acclamation.

President: Sam Cooper
Vice-President: David Cheek
Treasurer: Ted Fontelieu
Secretary: Steve Genotte

These officers will take office on January 1st. The Chapter deeply appreciates the willingness of these members to step forward and lead us into the new Millennium.

2001 Board of Directors

By Sam Cooper

A nominating committee has been formed to locate Chapter members who are willing to serve on the Chapter's Board of Directors (BOD). The primary duties of these Board members are to attend the monthly BOD meetings. The BOD provides assistance, input, direction, and a sounding board to the Chapter's elected officers.

Lately, Chapter 168 has been blessed with active and involved Officers and Board of Directors members. This has been vital to helping us plan and execute the variety of activities that we had in 2000. To help us maintain our momentum in 2001; please consider volunteering to run for a 2001 Board of Directors position.

The current Officers and Board of Directors would like to thank the BOD nominating committee (Bo Bauereis, Jerry Mrazek, Michael Stephan), for leading this effort.

December Young Eagle Events

By Michael Stephan

If you thought the Young Eagles events were over for the year, think again. Jim Quinn has found a group of girls that are academic achievers. It is a group that schedules educational activities outside the classroom. Jim says that this is a very motivated bunch. So, he divided them into three smaller groups. Groups of a size that can be flown in a few hours. The dates are the first three SUNDAYS in December (3rd 10th 17th) and the start time is 1pm (1300). We plan to fly 20 or more girls each day. Since the girls live in the southeast area of Dallas, the events will all be at Redbird Airport.If you plan to volunteer or have any questions call Jim Quinn at 972-788-2593. I look forward to seeing you there.

First Annual Chili Cook Off?.....Delicious!

By Ann Asberry

Here are highlights from the 1st annual 168/1246 Chili Cookoff.

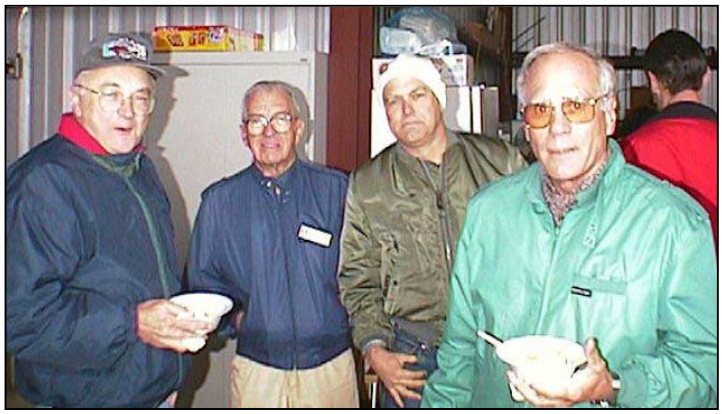
20 Pots of Chili. 5 entries from North Texas Ultralight Pilots Assoc. (NTUPA). The rest split about even between Chapter 168 and 1246 with several representing dual membership in both Chapters or other organizations. Also represented was the North Texas Flying Club, Chapter 914 from Caddo Mills and the McKinney CAP.

The judges were:
Sallye Nelson, Control Tower Operator, McKinney Airport. Tim Sokol, Dallas FISDO. Gregg Edwards, McKinney Fire Department.

Winners are:

First Place: Ralph and Alane Capen

- *First Place*, Ralph and Alane Capen, No Kill Chili (vegetarian no less) from Chapters 168 and 1246. Prize, 25 Gallons of 110LL donated by the Greenville FBO at Majors field. $25 cash supplied by NTUPA.
- *Second Place*, Gus Gustovich, Julie's Chili, from NTUPA and Chapter 914. Prize, $25 gift certificate to the Lone Star Pilot Shop in Addison, donated by owner Earlette Shultz. $15 cash supplied by NTUPA.
- *Third Place*, David Lyles and Janet Longstreth, Captain Dave's Twin Afterburner Chili, from Chapter 168. Prize, $25 gift certificate to Lowe's. $5 cash supplied by NTUPA.
- *Honorable Mention*, Jerry Brands, from NTUPA. Prize $10 gift certificate to Chili's restaurant.
- *Honorable Mention*, Ann Asberry, Torque Roll Chili (you come back through your own smoke), from Chapters 168, 1246 and NTUPA. Prize, $10 gift certificate to Chili's restaurant.
- *Honorable Mention*, John Cox, Fire and Ice, from NTUPA. Prize, $10 dollar gift certificate to Chili's restaurant.
- *The Pepto Bismol Award* for the hottest Chili, Tod, Kim, Katy and Joy Williams, Fire House Chili, from Chapter 1246. Prize, a very large bottle of Pepto Bismol.
- *Popular Vote* by all the attendees, Garry and Janne Ackerman, Chapter 1246 and the North Texas Flying Club. Prize, a ceramic "Chili" chip and dip set and $10 gift certificate to Chili's restaurant.



Chapter 168 well represented.

Popular Choice winners: Janne and Gary Ackerman

Mountain Flying

by K. Truemper

Acknowledgment: We thank Darrel Watson very much. He reviewed a first draft and suggested a number of improvements.

Each time I plan a flight to the Rocky Mountains and beyond, I think ``Now, what are the important things to consider when flying into mountainous areas?" and then, ``Wouldn't it be nice if I had a summary of those things for review!" So, here is an attempt at such a summary. It is based on many sources: flight instructors, fellow pilots, various publications such as Sport Aviation and AOPA Pilot, and, last but not least, Nature, which has had an impressive way of teaching me lessons.

The discussion below introduces some formulas that I have found useful. If you hate mathematics and formulas, just ignore that stuff. For me, doing these computations while flying is a way to stay alert and to have something to talk about with my copilot.

1. Takeoff

1.1 Density Altitude

We must know the density altitude to estimate the minimum runway length required for takeoff. An approximate formula for density altitude is

D = A + (T/20) + (A/4) – 3

where D = density altitude in 1,000 ft
A = altitude in 1,000 ft MSL
T = temperature in deg F

For example, if A = 6 (= 6,000 ft) and T = 80 (= 80 deg F), then D = 6 + (80/20) + (6/4) - 3 = 8.5 (= 8,500 ft).

A more precise formula would use the pressure altitude P instead of A. To compute P, we subtract from A 1,000 ft for each inch of pressure setting above 29.92, and add to A 1,000 ft for each inch below 29.92. This correction is rarely needed, though, since the pressure setting typically lies in the interval 29.6-30.2 in., and P and A differ then by less than 300 ft.

A deceptively low density altitude occurs sometimes in the summer before sunrise. Due to radiation cooling of a clear night, the surface air is cool, but from 500 ft AGL on up the air is still hot. This phenomenon is typical for the southern Rockies, but may occur as far north as Montana. I have seen 60 deg F at the surface and 95 deg F at 500 ft AGL. In such a case, the high-density altitude from 500 ft AGL on up significantly reduces the climb performance of the airplane right after takeoff.

1.2 Leaning of Mixture

If the plane has a carburetor without automatic altitude compensation, leaning of the mixture for maximum engine output is essential when the density altitude exceeds 5,000 ft. Just before takeoff, we go to full power while holding the plane with the brakes, adjust the mixture until maximum rpm is obtained, then release the brakes and begin the takeoff run. Below 5,000 ft density altitude, leaning is not needed, and is even dangerous, since the engine may overheat during the climb out. As an aside, leaning should be done en route below 5,000 ft density altitude whenever the power setting is 75% or less, and should always be used above 5,000 ft density altitude regardless of power setting. The leaning is done so that the engine is smooth and gives maximum rpm for the given throttle position, and so that any additional leaning would disturb that performance.

1.3 Sudden Weather Changes in the Morning

A sunrise with a clear sky and with unrestricted visibility usually promises perfect VFR conditions for the morning flight. Usually---but not always. Indeed, rapid fog development and cloud formation shortly after sunrise may within 30 minutes turn that scenario into IFR IMC. The spread between the air temperature and the dew point plus the surface winds are the best predictors for this potentially dangerous development. Any spread less than 5 deg F at sunrise combined with surface winds below 5 kts is cause for concern. When the spread is 1 or 2 deg F, then the problem is almost certain to occur. On the other hand, when the spread between the air temperature and the dew point is more than 3 deg F and surface winds exceed 5 kts, fog should not be a problem. However, in that scenario clouds may still form rapidly unless the spread exceeds 5 deg F.

The solution to the problem is simple. We do not take off at sunrise when a potentially troublesome situation is at hand, and instead monitor how things develop. If clouds and fog do not set in for an hour while the air temperature rises and the spread increases, the weather apparently is stable, and a takeoff is justified. On the other hand, if low areas develop fog or if mountain ridges begin to spawn cloud cover, we stay on the ground until stable VFR conditions return.

2. En Route Flying

2.1 Ceiling of Plane

The legal limit for flight without oxygen or pressurization is 12,500 ft MSL. That limit may be exceeded up to 14,000 ft MSL for up to 30 min. Naively, we may therefore conclude that a plane with a published ceiling of 14,000 ft can take advantage of these limits. But this is not so. First, a plane's ceiling is the density altitude where the climb rate at full power begins to fall below 100 ft/min. This is a very low climb rate. A better figure for the ceiling is the published ceiling minus 1,000 ft. So, a ceiling of 14,000 ft has become 13,000 ft. Suppose, we fly eastbound, where we must elect odd-thousand-plus-500 ft as MSL altitude. Say we choose 11,500 ft MSL. If the temperature at that altitude is 50 deg F, a typical value for the Rockies in the summer, then the density altitude is
D = 11.5 + (50/20) + (11.5/4) - 3 = 13.9 (= 13,900 ft), which is above the 13,000 ft the plane can reasonably reach. Hence, we are forced to the next lower altitude, 9,500 ft MSL, which is too low for many regions of the Rockies. This example shows that a plane with published 14,000 ft ceiling is unsuitable for flight in the Rockies in the summer. On the other hand, a bit of calculations shows that a plane with a published 17,000 ft ceiling manages to reach altitudes up to 13,500 ft MSL in the Rockies in the summer, within reasonable time, unless temperatures are unusually high.

A normally aspirated piston engine loses power by about 3.5% for every 1,000 ft of density altitude. The formula below expresses this relationship.

PD = [1 - 0.035D]P
where D = density altitude in 1,000 ft
PD = max power output in hp at density altitude D
P = maximum power output in hp at sea level

For example, if D = 12 (= 12,000 ft) and P = 100 (= 100 hp), then PD = [1 - (0.035)(12)]100 = 58 (= 58 hp).

If the propeller is not in-flight adjustable, the maximum engine output at altitude may no longer be sufficient to maintain cruise rpm. When that happens, the output is reduced below PD of the formula. To compute engine output for the reduced rpm, we apply the above formula for PD using as P the maximum output of the engine for the reduced rpm at sea level. For example, Rotax publishes 76 hp for the 912UL engine as maximum continuous output at 5,400 rpm, and 64 hp as maximum output at 4,400 rpm. Suppose at 14,500 ft density altitude the maximum rpm with full throttle is held to 4,400 rpm due to the propeller pitch. Using P = 64 and D = 14.5, the output for that density altitude and rpm is PD = [1 - (0.035)(14.5)]64 = 31.5 hp. On the other hand, if the propeller is repitched so that the engine can turn 5,400 rpm at the same density altitude, then P = 76 and PD = [1 - (0.035)(14.5)]76 = 37.4 hp, an increase of 19%.
That increase could be realized if the propeller was in-flight adjustable. Hence, such a propeller can be advantageous even if the engine is normally aspirated.

2.2 Turbulence

An important predictor of severe turbulence is the wind aloft just above the mountains. When that wind exceeds 25 kts, flying can be extremely dangerous since turbulence may invert the plane. If such winds are approximately (= plus or minus 30 deg) perpendicular to mountain ridges, then they produce mountain wave conditions and turbulence up to 100 miles downwind from the mountains. Hence, if winds above 25 kts are forecast, we should not fly near mountains, and if we are downwind from mountains, we should not approach them.

Another predictor of turbulence is the temperature lapse rate, measured in deg F/1,000 ft of altitude change. A lapse rate below 4 deg F/1,000 ft signals stable air. When the lapse rate rises beyond 4 deg F/1,000 ft, turbulence can be expected. The severity depends on how far the lapse rate is above 4 deg F/1,000 ft. For example, a rate of 6 deg F/1,000 ft is associated with strong turbulence. We can anticipate potentially troublesome situations by computing the lapse rate as we climb. The formula for the lapse rate is L = [TG - TA]/[A - G]

where L = lapse rate in deg F/1,000 ft
A = altitude in 1,000 ft MSL
G = ground elevation in 1,000 ft MSL
TA = temperature at altitude A in deg F
TG = temp at ground elevation in deg F

For example, if A = 9.5 (= 9,500 ft), G = 4.5 (= 4,500 ft), TA = 70 (= 70 deg F), and TG = 100 (= 100 deg F), then L = [100 - 70]/[9.5 - 4.5] = 6, and severe turbulence is present.

The turbulence induced by the lapse rate stops at the base of clouds. Hence, if cumulus clouds are sufficiently low and widely spaced to permit safe VFR above the clouds, we can elect that option for a much smoother flight. We must exercise caution, though. Cumulus clouds in mountainous areas may within minutes grow to a solid cover, so when flying above such clouds we should continuously monitor the situation and be prepared for a rapid descent below clouds that are closing up.

Certain cloud formations are telltale signs of strong turbulence. A rotor cloud, which is a small, round cloud downwind of and slightly higher than a mountain ridge or peak, indicates severe turbulence and must be avoided at all times. Lenticular clouds, which have the shape of a lens, by themselves indicate smooth airflow at the altitude of the clouds, but signal strong turbulence below them. Fuzzy, streaky, torn clouds above a ridge are a third indicator of severe turbulence. Cumulus clouds with veils below that do not extend to the ground send yet another message of strong turbulence. The veil is called virga and is rain that evaporates before reaching the ground. Virga clouds can turn into thunderstorms within minutes, so we should monitor them continuously.

Thunderstorms in mountainous terrain can be very violent. They typically produce extensive lightning, strong downpours, severe turbulence, and often hail. A respectful distance of at least 20, and preferably 30, miles should be kept.

A flight started early in the morning usually begins with a smooth ride. As the air warms and winds increase, turbulence sets in. Around noon, the turbulence typically has become so strong that the flight should be terminated. For the latest, we should stop at 1 pm. There are exceptions where the air is still smooth after 1 pm and where flying is still safe. But we should carefully consider winds, terrain, and weather before claiming that this unusual case is hand. If we miscalculate, then in the best of cases we have an uncomfortable flight. In the worst of cases, passengers toss their cookies, the flight becomes almost uncontrollable, and possibly metal is bent in an unintended termination.

2.3 Winds

When air moves up due to sloping terrain, say toward a mountain ridge, the air remains mostly smooth and provides an updraft. However, on the lee side of the ridge, the air becomes a turbulent downdraft with a rate of descent that may exceed the maximum climb rate of the plane. When planning the route, we should therefore take both the direction of the winds aloft and the terrain into account. If the route can be planned along the upwind side of a ridge, then the flight is smooth, and the updraft provides extra energy that can be converted into added speed. On the other hand, if the route by necessity is on the lee side of a mountain or ridge, we must fly at least 2,000 ft above the highest point of the terrain to avoid strong down drafts and turbulence.

We should never approach a mountain ridge at a right angle. If turbulence is encountered and we must turn back, then in the first part of the turn we get even closer to the ridge and thus into more severe turbulence, and possibly begin unplanned inverted flight. This dangerous scenario can be avoided by approaching the ridge at a shallow angle not exceeding 45 deg. If turbulence is encountered, we can turn away from the ridge without first getting closer.

We should avoid flight in valleys since by definition this moves us well below the surrounding mountain ridges. But sometimes that is not an option. For example, we may have to enter a valley to approach an airport. In that case, we should always stay near the mountain ridge that forces the wind up, and should avoid the center of the valley as well as the ridge with the downdraft. It is clear why we should avoid the ridge with the downdraft, but why should we shun the center of the valley as well? If we fly there, we do not have a good look at the valley below for emergency landing sites, and we may have difficulty turning if unexpected turbulence forces us to do so.

2.4 Restricted Areas & Military Operations Areas

Restricted areas are off-limit for general aviation, and we must stay clear of them at all times. In recent years, restricted areas have moved or changed shape, and a GPS radio with last year's or older database does not reliably indicate the current restricted areas. Hence, unless the database contains the most recent information, we can only use the sectional to identify and avoid restricted areas. A recent development are small, round restricted areas of 5-10 miles diameter. They contain tethered balloons. Entering such an area is likely to terminate the flight by collision with the balloon cable.

MOAs legally pose no restriction for general aviation. But when an MOA is ``hot,'' that is, in use, we assume a great risk when entering it. The sectionals have rather imprecise information about MOAs, since they typically specify sunrise to sunset for certain days of the week as possible times of use. During those specified times the MOA may or may not be hot. We just cannot tell which is the case from the sectional. But we can get precise information from the nearest FSS.

Recently, sectionals have begun to provide contact frequencies for some MOAs that result in something akin to flight into C space. We declare the intentions, are assigned a transponder code, and follow the instructions of the military controller. We should make sure to request permission for any deviation from the assigned altitude or course. Just telling the controller the entire planned route through the MOA at the first contact is not good enough. Another recent development are grey-shaded Special Military Activity areas. For transit, we must establish contact on the frequency listed on the sectional unless we desire to be mistaken for a drug runner.

2.5 Endurance

The legally required minimum endurance for day VFR, which is 30 min beyond the destination airport, is not even close to sufficient, due to the vagaries of mountain weather and winds. A good rule is 1 hr of fuel beyond the planned flight time, and 1 1/2 hrs if the route has few nearby alternate landing sites or if the weather is potentially unstable.

3. Landing
3.1 Turbulence

It is rare that the approach to landing does not encounter some turbulence. To minimize the effect, we should plan a comparatively steep descent to the destination airport. Such an approach also provides a good overview over the terrain near the airport.

3.2. Traffic Pattern

At uncontrolled airports in mountainous terrain, we should not expect pilots to adhere to the published traffic pattern. Instead, we should count on any pattern, on any entry, and even on use of runways in both directions. The key to a safe approach and landing is monitoring of the traffic frequency, repeated broadcast of our position, and watching, watching, watching for traffic. Even on the ground, we should announce all steps such as clearing the runway or taxiing across another runway, due to the topsy-turvy way runways are sometimes used.

3.3 Landing Speed

When the density altitude of the airport is high, the groundspeed during landing is well above the indicated airspeed. When in that situation a gust factor is added to the indicated airspeed due to shifting winds, the groundspeed at the moment of touchdown

becomes even higher. Thus, slowing the plane down after touchdown may require an extended rollout. For example, suppose the density altitude of the airport is 9,500 ft. If the landing speed is 50 kts plus a 5 kts gust factor, then, according to the formula for TAS given in the next section, the indicated airspeed IAS of 55 kts represents a true speed TAS = [1 + ((1.5)(9.5)/100)]55 = 63 (= 63 kts). Suppose we have a 10 kts headwind as we land. Then we touch down with a groundspeed of 63 - 10 = 53 kts. In contrast, a normal landing speed of 50 kts in smooth air, at sea level, and with a 10 kts headwind produces a groundspeed of 50 - 10 = 40 kts. Effectively, the normal landing groundspeed of 40 kts in smooth air at sea level has become 53 kts. Since the kinetic energy of the plane increases with the square of the groundspeed, the energy that must be dissipated during the rollout by the drag of the airplane and by the brakes, is increased by 76%. Thus, the rollout is much longer than usual.

4. Two More Formulas

Here are two additional simple formulas. They give reasonable estimates for the true airspeed and the course correction for crosswind. En route, we can compare the true airspeed with the groundspeed displayed by the GPS radio to get an idea how far forecast winds aloft differ from actual winds. The course correction formula comes in handy during flight planning.

4.1 True Airspeed

Up to 15,000 ft density altitude, true airspeed is larger than indicated airspeed by approximately 1.5% for each 1,000 ft of density altitude. The formula below expresses this relationship.

TAS = [1 + (1.5D/100)]IAS
where TAS = true airspeed in kts
IAS = indicated airspeed in kts
D = density altitude in 1,000 ft

For example, if IAS = 95 (= 95 kts) and D = 10 (= 10,000 ft), then TAS = [1 + ((1.5)(10)/100)]95 = 109 (= 109 kts).

4.2 Crosswind Correction

The magnetic heading is the magnetic course plus or minus the course correction for crosswind. That correction, in deg, can be estimated as follows.

CC = CW/K
where CW = crosswind in kts
K = factor depending on plane speed
(K = 2 for 100 kts; K = 3 for 150 kts, K = 4 for 200 kts)

For example, if the crosswind is CW = 10 (=10 kts) and the plane does 100 kts, then K = 2, and CC = 10/2 = 5 (= 5 deg) is the correction for the crosswind.

This is the end of the summary. I have tried to cover the most important aspects of safe summer flying in mountainous terrain. But the summary is not complete: It does not tell about the excitement of an early morning takeoff from a mesa into a clear sky, with mountain tops tinged red by the first rays of the sun and with dark valleys below; does not speak of the peace and serenity of a midmorning flight across a majestic mountain range topped with snow. And does not even mention the great feeling of a slow descent into an airport nestled on a picturesque mountain side, with friendly FBO folks and fellow pilots just waiting for us to land and visit and talk. Talk about what? About flying, of course!

Classifieds

Aviation ads (For Sale, Wanted, Etc.) can be placed by Chapter 168 members free of charge.
Send to: Chapter 168 Newsletter, 1317 Seminole Drive, Richardson Texas 75080 or brott@mindspring.com

Airplanes For Sale:

Starduster II, completed 1970, 466 totals Hrs A+E, repainted 1991.
⁕ Call Ken Whitehead 972-529-9597 (8)

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⁕ Call Dan Williams (H): 281-373-3903 (W) 713-339-2626

PS Engineering PM2000 Intercom; four channel stereo, panel mount intercom with individual volume and VOX circuits for pilot, copilot, and passengers 1-&-2. Used for 207 hours in RV-6A - works perfectly - replaced with Audio panel. $379 new, asking $200.

Altimeter: 3 1/8 United Instruments 0-20,000, Works good for VFR aircraft, needs window to dial adjustment. Make offer
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Web Site Address: http://www.vline.net/eaa168/news.htm

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