Sugarbush SOARING
www.sugarbushsoaring.com

The Flight Line

Volume 34 No. 1

May 2017

OPENING DAY

Welcome back to Sugarbush Soaring – Spring 2017. Opening day is Saturday, May 13th. There will be a safety meeting at 9 am and an opening day dinner at 5:30 at Mad River Glen's General Stark Pub.

Your club has been working hard to ensure that 2017 will be a great Soaring Season. Its full 7 day/week operation with the PW-6, the ASK-21, Grob 102, a newly restored 1-26E and our 2 SGS 2-33 gliders promises to make Soaring available to everyone.

The third Annual President's Cup Race, evening cookouts, two Youth Camps, and the great wave flying in October are just part of the excitement.

Check our new web pages for more details at www.sugarbushsoaring.com. If you have not already setup a login for yourself, you can click on the "Forgot Login?" Link under Members/Login. If you then select the "Lost Password" option, the web site will email you a new password.

Sugarbush Soaring Assn. Board

The Club Buys a Like-New All-Metal 1-26E!!

Arriving on the field at about Opening Day will be a completely rebuilt 1-26E! The ship is being rebuilt by K & L Soaring, the successor organization to the Schweizer Aircraft Company. This model, the 1-26E, is all-metal, except for the flight control surfaces. A photo of a nice 1-26E, but not ours, accompanies this article. With many of the current Line Crew,as well as other members, checked out in the 1-26, interest in this ship has grown greatly in the past couple of years. Many of you may know that N5702S, our current 1-26, is in need of some expensive repair and re-covering work. After getting a very high quote on this work, a group of members did a thorough search of what was available in the 1-26 fleet in the eastern half of the country. We investigated ships that were in various levels of condition and the probable costs to make them into the kind of ship we wanted in our fleet. At the end, the decision was made to go with the best one we found, this 1-26E at the Schweizer facility.

An all-metal 1-26E similar to the new club ship.

In addition to the various sections of the wings, tail, and fuselage being rebuilt, all the fabric-covered flight control surfaces are being recovered, and of course the ship will come with a completely new paint job. There will be a new Becker radio installed, with a push-to-talk switch on the stick and a boom mike mounted on the side of the cockpit. We all look forward to having this ship with us, and getting to fly it.

Bob Messner

Last years rigging crew. L to R: Tom Grady, Alex Scaperotta, Carson Courchaine, Ian Clark, and Bob Messner

SOME IMPORTANT REGULATIONS, SAFETY, AND SECURITY POINTS

1. Drug testing – Important to know that specific language in CFR Title 14, 91.147 mandates drug testing for operators, pilots giving sight-seeing rides for compensation or hire, but the wording only specifies "for compensation or hire in an airplane or rotorcraft." **Glider pilots aren't "exempt" – we are simply not included.**

2. TSA regulations on training aliens- According to TSA Docket No. TSA-2004-19147 issued October 29, 2004 "TSA is granting an exemption from 49 CFR to flight schools that provide, and individuals who apply for, instruction in the operation of airships, balloons, or gliders, as those terms are defined at 14 CFR 1.1." Glider pilot training is exempt from TSA regs governing the training of foreign students.

3. Emergency Action Plan - The Warren – Sugarbush Airport has an Emergency Action Plan – revised 5/2014 – that deals with what to do and whom to contact in the event of an accident, incident, overdue aircraft, field injury or illness, or an airport security issue. One is posted on the wall by the door in the inner office. Sugarbush Soaring's 911 address is: 2355 Airport Road. Not all issues require an immediate 911 call.

4. Airport Security - We are all responsible for creating a safe and secure airport. All aircraft are our responsibility while on the field and in hangars. Please make it a practice to always lock aircraft, remove keys, close and lock hangar doors, and make sure to report or question any unknown person or suspicious activity. We live in challenging times. Though it seems unlikely, perhaps, our little airport, with no fences, security gated entry, or 24 hour surveillance, is vulnerable to unauthorized visitors. Call to report suspicious activity if necessary after hours and after talking to airport supervisory personnel: 1. Dept. of Homeland Security: 1-866-427-3287 (1-866-GA-SECURE), 2. TSA National Number: 1-866-289-9673, 3. VT State Police: 496-2262. 4. FBI Burlington: 802-863-6316. Determine the seriousness of the occasion to decide which of these agencies to call.

5. NASA Report- Forms are in the office – report any occurrence that could have resulted in an accident or incident. Informs FAA of possible problem areas and may protect you from punishment for a violation. Not used for accidents, deliberate violations of FAA Regs, or illegal actions.

6. Basic Intercept Procedures. In response to a violation of a TFR: Lead aircraft moves to your left – wing rock- means: follow me Abrupt break away: you may proceed Overflying airport with gear down: land here

7. Why we use checklists – They are for everyone. They are not a "crutch" for beginning pilots and an unnecessary nuisance for all of us "experienced" pilots. Let's look at one of the checklists we use (there are other acceptable forms of it – use one that is appropriate for your aircraft and be consistent!)

BEFORE TAKEOFF CHECKLIST

Altimeter – Thunderbird pilot Capt. Chris Strickland improperly set his altimeter (AGL /MSL) resulting in the crash of a 20 million dollarThunderbird F-16 at an airshow September 14, 2003 – experienced pilot.

Belts – Bessie Coleman, the brilliant first African-American female pilot and expert aerobatic pilot died April 30, 1926 when she fell out of an airplane in an aileron roll because she didn't fasten her seatbelt – experienced pilot. Still a problem to this day with loose/undone belts!

Controls – Several accidents both power and glider over the last few years involving controls that were improperly hooked up.

Cable – Rope breaks, faulty release mechanisms have caused numerous incidents and accidents at soaring sites over the years.

Canopy – Improperly fastened canopies result in the shock of a canopy flying open often at the most critical time – remember: the glider is still manageable even with the canopy open, broken, or off the aircraft.

Dive brakes – They may be closed and look locked, but every soaring sitehas had the 'inadvertent takeoff with dive brakes open' on takeoff or tow – yes, some were "experienced" pilots.

Direction – Which way do you turn if the rope breaks and you have enough altitude to get back to the airport? What is the crosswind component? How will that affect your takeoff? Loss of directional control on takeoff or landing continues to be a leading cause of accidents.

Please know your checklists! Have the printed checklist out, but go overthe items from memory, then check to make sure you haven't skipped an item. Look over the items and know why they are important enough to be in the checklist, as we just did with the Before Takeoff Checklist.

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IMPORTANT POINTS CONTD.

Perform a preflight before you fly – if you have just assembled your aircraft, get someone to help you and do a positive control check. Make sure your belts are tight, your radio is on, and you have radio contact on the right frequency, and that you are aware of any potential traffic conflicts or adverse weather conditions.

Have a "flight plan." Have in mind where you'd like to look for lift, where you intend to go and what altitude you might go to on tow. Make sure that you inform the tow pilot if you want a pattern tow or a specific spot for release. Be flexible and ready to change your "flight plan" if conditions warrant (and they will).

Remember: THE MOST IMPORTANT GOAL OF ANY FLIGHT IS A SAFE LANDING WITH PILOT AND AIRCRAFT INTACT. Vince Lombardi said about football: "Winning isn't everything – It's the ONLY thing." When it comes to flying, remember: "Flying safely is "THE ONLY THING."

- Rick Hanson

4th ANNUAL SUGARBUSH SOARING PRESIDENTS CUP RACE

The 2017 Sugarbush Soaring Presidents Cup race will be held from Saturday, July 1 through Sunday July 10, 2017. The event will be held over nine days to help ensure several good soaring days. The Presidents Cup Race is open to all members .... and is for the fun, entertainment, and bragging rights of the Sugarbush Soaring membership. No data loggers required. Turn point completion is on the honor system. A brief summary of the rules and classes follows:

COURSE: All participants will be given a 3000 tow to the vicinity of Mt.Abe. The course extends from Mt Abe to the peak of Scragg Mtn to the southeast corner of Blueberry Lake to the finish line abeam the Gazebo downwind to runway 22. If Runway 4 is in use the course is reversed....ie. Mt Abe to Blueberry Lake to Scragg Mtn to the finish line abeam runway 4. The course is designed for safety. At any time, if altitude warrants, participants may abandon the course and return to the airport. Landouts will be frowned upon and certainly will earn special recognition. In order to prevent a "Final Glide Only", as happened in the inaugural event (the Fritz Horton rule), for the High Performance Class only, Participants must circle the course twice....that is, return to Mt Abe on the first loop then the course to the finish line.

CLASSES: In order to maximize participation the event has three classes: Low Performance: Best L/D < 30 eg. SGS 126, SGS 233 Medium Performance: Best L/D 30-37 eg. ASK 21, PW6, SZD Jr. High Performance: Best L/D > 37 eg. LS4, Discus, DG 300, HpH 304

PARTICIPATION: Members may run the course as many times as they wish and in as many classes as they wish. If a member runs the course multiple times, the best score (time) will be used to determine the final results. Pre-solo students may enter the race with their instructors. Post solo students may enter the race solo with the approval of their instructor and the race committee.

SPECIAL RULES: At the start, participants may not Climb (thermal) intentionally to, for example, 6000 ft MSL then dive at terminal velocity to the start line. Upon tow release, participants are expected to proceed directly to the start at Mt Abe. After the start time is recorded, any thermaling along the course is appropriate.

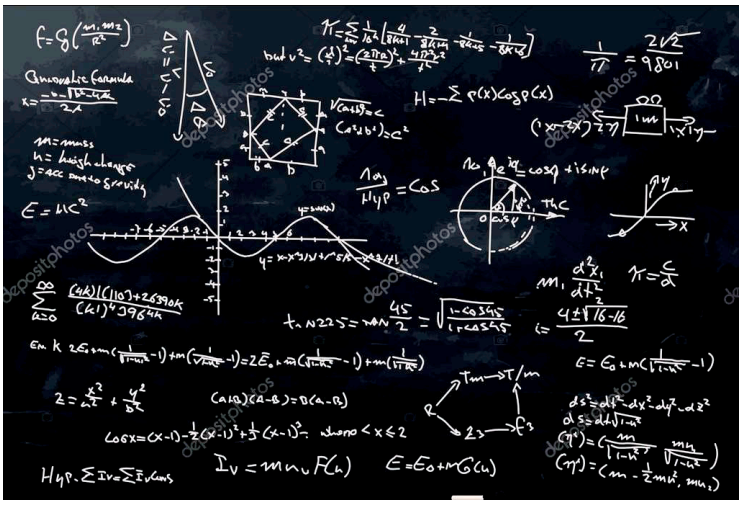
f desired, participants may reach the finish line at pattern altitude (2500 feet MSL), or, if they wish to continue their flight, soaring conditions permitting, may cross the finish line as high as 3000 ft MSL. The participant may at their option return to Mt Abe at 4500 MSL and run the course again.....or simply continue their flight. Any participant that crosses the finish line significantly below pattern altitude (eg. 2000 MSL) will be disqualified.

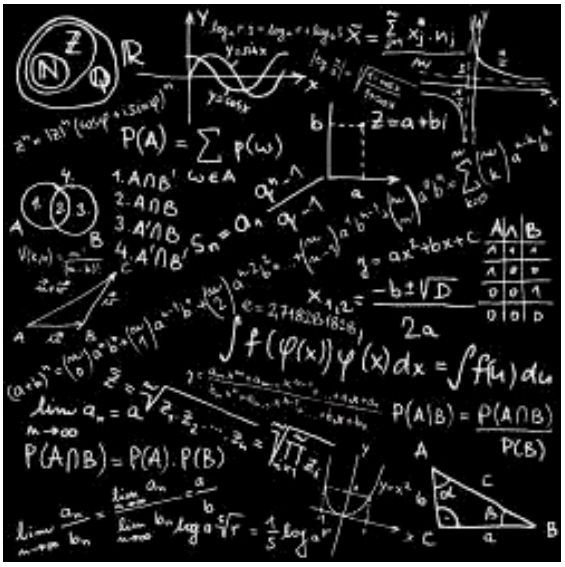
The Presidents Cup Race is for fun only.....(and bragging rights). Members planning to participate in club ships should schedule early to ensure availability at the desired times. Detail rules are available on the Sugarbush Soaring office bulletin board. For any questions, please contact the Race committee.

Steve Platt
Presidents Cup Race Committee

THE "UNIFIED FIELD" THEORY

The greatest challenge in physics, I am told, is the search for a Unified Field Theory that reconciles the differences in the laws governing the sub-atomic world and the larger visible macroscopic world in which we live our daily lives. It seems impossible that our world is both getting smaller and larger at the same time. Our collective world is expanding with instant communication, faster travel, and increasing globalization. At the same time, we have become more focused, specialized, and discriminatory. Can we have it both ways? We, as pilots, are members of a relatively small group, a fraction of the larger, constantly expanding human population. We, as pilots that fly for sport, and, finally, as glider pilots, represent and even more finite group. As the population increases and life becomes more complex and technical, it becomes more difficult to be a member of both the larger group of pilots, and the smaller sub-set of glider pilots flying for fun. Even though we may fly for sport, plan to return to the same airport from which we departed, and assiduously follow local regulations, we must always remember that we are governed also by the same larger laws of our world (gravity, weather, aerodynamics, economics, international and domestic regulations), and keep current in our membership in the larger group to which we belong.





Our little world of soaring is amazing. It is something we all love and cherish. It is easy to "specialize," to focus down on the local, the microcosm of flying sailplanesfor fun, but we must remember the "big picture" at the same time and be responsible members of the larger group. Let's all work to keep current on regulations, air space, new technology, and how we fit into the larger world of aviation. We are participants in a dynamic world of constant changes, both large and small. Let's make the airport a "unified field." Pun intended.

Rick Hanson

Editors note: Any resemblance the illustrations may have to any unified theory of any kind whatsoever is purely coincidental.

Vermont PBS visits Sugarbush Soaring

Gina Bullard and camera crew from PBS visited us last summer. The footage was featured on one of the Outdoor Journal programs.

Nine Weeks in the Land of the Long White Cloud

What I enjoyed the most about New Zealand were the reliably long summer days smack in the middle of winter. That and the rose gardens. The west wind was also reliable, strong and gusty. It kept the gliders on the ground many days when the sky was popping full of lenticulars stacked like flapjacks four and five high, and in every direction, and honestly too many to count. My primary base was Papawai, Wairarapa, Aotearoa, aka Greytown, North Island, New Zealand. Many places and landscape features have exclusively Maori names and the pronunciation makes position reports difficult. Aotearoa is Maori for The Land of the Long White Cloud, a lenticular I bet, that guided the Maori migrating across the Pacific to the North Island.

Wellington Gliding Club's migration from Paraparaumu to Papawai is recent, ambitious, and impressive. The club is strong and on a upswing. Work is underway to make a runway long enough to winch launch into the west wind (needing about 7000 feet of length). The club has a brand new 475 h.p. winch that hoists a DG1000 to about 2000 feet AGL. Launching into a strong west wind would take you higher, and put you into rotor to climb into wave.

Gregor Petroviã Winch Driver and Flight Instructor from Slovenia with 475 h.p.Winch

This season we were limited to winch launching on the 21-03 vector, and many days deteriorated into direct crosswinds that put us near the edge. But this was a great opportunity to master difficult but flyable conditions, similar to training on turbulent days at Sugarbush.

Greytown rivals Omarama for mountain wave. Coming off the Pacific ocean, the airflowis laminar year round. One day we hired a Pawnee to fly in to Greytown and tow us into the wave. Odd to me, the nearby airspace is VFR-only up to 9500. Above 9500, youcoordinate with ATC, but that seemed not worth the bother, and flying downwind to find a Foehn hole is not a great option since the Pacific Ocean is only 30 miles away. The airfield is 125 MSL and the local mountains go to 5000, high enough for new snow to stick in the middle of summer. Climbing through 7000, you see the Pacific Ocean to the east, west and south, and snow capped volcanoes to the north. The Pacific is very very blue and unlike Lake Champlain, there are no Adirondack mountains in sight on the far shore. The air in the Roaring Forties is pristine, unpolluted and clear on flyable days, and judging from my sunburn, it is clearer than even the best days in Vermont. This particular wave day was one of only three days that we flew into the Tararua mountain range to the northwest. We mostly flew over flat terrain or the low hills full of sheep to the east.

I was learning to winch launch, and I was in no rush, so I did not solo until the sixth week of my visit. The utter novelty and intensity of winch launching rekindled my 'beginners mind', and that left me receptive to persistent and incessant coaching from the flight instructor in the back seat about ... well, about everything. Real sticklers for finesse, they hammered me. Last fall in Vermont, I got tired of listening after an hour or two of instruction. But I was more or less receptive to 18 hours of dual instruction in New Zealand. Credit a change of scenery.

For the last two weeks of my visit, I moved north to Taupo, a 'Volcanic Zone', a 238 square mile lake filling the caldera of a dormant super-volcano, and a resort town known for "Adventure Sports". The Lake Taupo Gliding Club has everything going for it, seven day a week ops, near and distant mountains, a giant blue lake, a favorable micro climate, great history, facilities and aircraft, a grass field, nearby attractions and amenities, but it relies too heavily on two octogenarians, Tom Anderson and Sid Gilmore. A transition cometh. Field elevation is 1550 and Tauhara, a dormant volcano on the edge of the pattern, goes 2000 feet higher. The bowl of Tauhara's caldera is clearly visible from the air. It's densely vegetated with wisps of mist that give it a Jurassic Park vibe. I half expected to spot a dinosaur in the bowl. On many days a roaring west wind creates complex swirls of slope lift, sink, and rotor. I was introduced to the president of the gliding club, a very accomplished pilot who had recently hired a helicopter to retrieve his glider from the trees on Tauhara. This left me wary, so I favored the thermal soaring to the east, and as a bonus that kept me far away from the sightseeing helicopters that periodically roar up the slopes of the volcano. The local pilots took that in stride. It amazes me how the familiar becomes normalized (wherever you fly)

Besides the soaring, I took periodic overnight and day trips away from my 'base camps'. There is an abundance of natural and cultural experiences close at hand. I'm going back..

Paul Kram







Youth Camp 2016





MacCready Flight & Dolphin Flight 101

All neophyte glider pilots receive basic training in optimizing energy (altitude) to maximize distance in headwinds, tailwinds, sink, lift, and combinations thereof. For cross-country and competition pilots, knowing how to optimize speed is crucial to complete a task or remain competitive in a racing event. Paul MacCready's work in this area is to cross-country soaring flight what Newtons laws of motion are to classical Physics. In the January 1958 issue of Soaring Magazine Paul MacCready published his method of optimizing average speeds in gliding from thermal to thermal.

Paul MacCready's work is truly impressive. It provides a basis for X-country and competitive race pilots to optimize speed between thermals "knowing" or assuming what the net climb rate will be in the next Thermal. MacCready flight optimizes TIME not ENERGY between thermals. MacCready flight sacrifices altitude (energy) to go faster between thermals. Referring to figure 1. Pilot B flies from thermal to thermal at best L/D speed. Pilot C flies at the fastest speed possible to reach the next thermal (without landing out) and begin the climb back up to the start altitude. Pilot A flies at the optimum speed (MacCready speed) to reach the next thermal and climb back to the start altitude **in the shortest amount of time.**

Pilot B reaches the next thermal to begin the climb back to the start altitude at the slow est speed but uses the least amount of energy or altitude to reach the thermal. Pilot B keeps the most energy "in the bank" ..ie. remains at the highest altitude at all times. Pilot A reaches the next thermal to begin the climb back to the start altitude slower than pilot C, faster than pilot B, but climbs to the start altitude in the shortest total time….ie. the glide time plus the time to climb back to the start altitude…..the best average speed. Pilot C reaches the next thermal to begin the climb back to the start altitude faster than both pilots but uses the most time to climb back to the start altitude…. and reaches the start altitude after Pilot A……and maintains the least energy "in the bank" ….ie…lowest altitude at all times after leaving the start altitude.

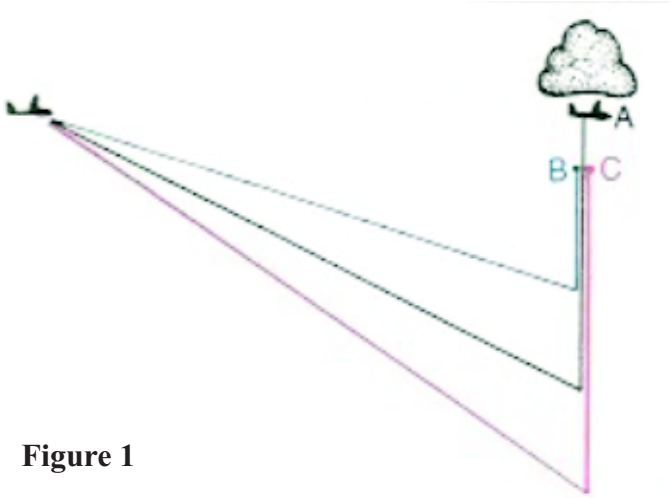


Figure 1

Pilot A flies at the optimum MacCready speed and achieves the best average speed. Pilot B flies using the least energy. Pilot C consumes the most energy. Flying at MacCready 1 presumes the target thermal will yield and average net climb of 1 knot back to the start altitude. Flying at MacCready 2 presumes the target thermal will yield and average net climb of 2 knots back to the start altitude. Flying at MacCready 3 presumes the target thermal will yield and average net climb of 3 knots back to the start altitude….etc., etc.

The Speed-to-Fly (STF) for MacCready X is identical to the STF to maximize distance in X knots of sink. The proof of MacCready theory is shown in a number of excellent texts (Reference 1: "The Complete Soaring Pilots Handbook" by Welch and Irving, and Reference 2: "Cross-Country Soaring", by Helmut Reichmann) and will not be repeated here. The optimum STF depends, of course, on theflight polar for the glider in question for the appropriate operating weight. For example, for the PW6flight Polar shown in Figure 2, flight at MacCready 4 speed yields 70 knots…… identical to the STFto maximize distance in 4 knots of sink.

To put MacCready flight speeds in perspective for a medium performance, 34 to 1, PW6 glider at a max gross weight with a best L/D speed of 56 knots ,(see Figure 2), flying at MacCready speeds yields:

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MacCready 0 = 56 knots	MacCready 1 = 60 knots	MacCready 2 = 63 knots	MacCready 3 = 67 knots
MacCready 4 = 70 knots	MacCready 5 = 73 knots	MacCready 6 = 76 knots	

The MacCready solution is independent of wind as the solution maximizes average speed thermal to thermal. If the airmass is moving (winds aloft) there is no impact to the thermal to thermal solution.

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MacCready Flight & Dolphin Flight 101 Contd.

However, for the final Glide calculation the winds aloft affect the final Glide altitude at which the pilot may leave the last thermal for the final glide to the destination. Once again, if the final thermal has a Climb rate of X, the final final Glide should be performed at MacCready X speed and the altitude to leave the last thermal should be based upon the effective glide ratio at MacCready X speed with the headwind/tailwind taken into consideration.The practical application of MacCready theory has been "tweeked" over the years to deal with the real complexity of the atmosphere and, for the recreational x-country pilot, to reduce the probability of landing out. For example, while the average net thermal lift might be 4 knots, in reality, one thermal might be 2 knots, the next thermal 4 knots, the third thermal 6 knots, etc. A commonly accepted, implementation of MacCready theory in this circumstance is for the glider pilot to "pass up" any thermal less than the MacCready setting (ie….expected average net thermal climb rate)….that is, assuming adequate altitude, pass up thermals less than the MacCready setting, and climb in thermals equal to, or stronger than, the MacCready setting. In theory the MacCready setting is the expectedaverage net climb in the next thermal. In reality, the MacCready setting is the weakest thermal the Glider pilot is willing to stop for. While thermal strength varies thermal to thermal, it also varies within a thermal. While often thermal strength increases with altitude, on occasion it also decreases at the top. A commonly accepted implementation of MacCready flight is to stay in a thermal until the climb averager decreases below the MacCready setting (Reference 3). Since MacCready flight uses energy to fly faster between thermals, the higher the MacCready setting the more energy consumed in the glide to the next thermal and the lower the average altitude and minimum altitude become compared to flying at a lower MacCready setting. As a result, the higher the MacCready setting the higher the probability of landing out. One modification to pure MacCready flight used by some cross-country pilots is to lower the MacCready setting (ie. slow down) for each reduction of 1000 feet in altitude. For example, on a day then the average net thermal climb is expected to be 4 knots, use MacCready 4 setting when 4000 ft above the destination finish altitude, slow to MacCready 3 at 3000 feet above, slow to MacCready 2 at 2000 feet above, and MacCready 1 at 1000 above the destination finish altitude which lowers the threshold to accept a thermal to climb back up in altitude.

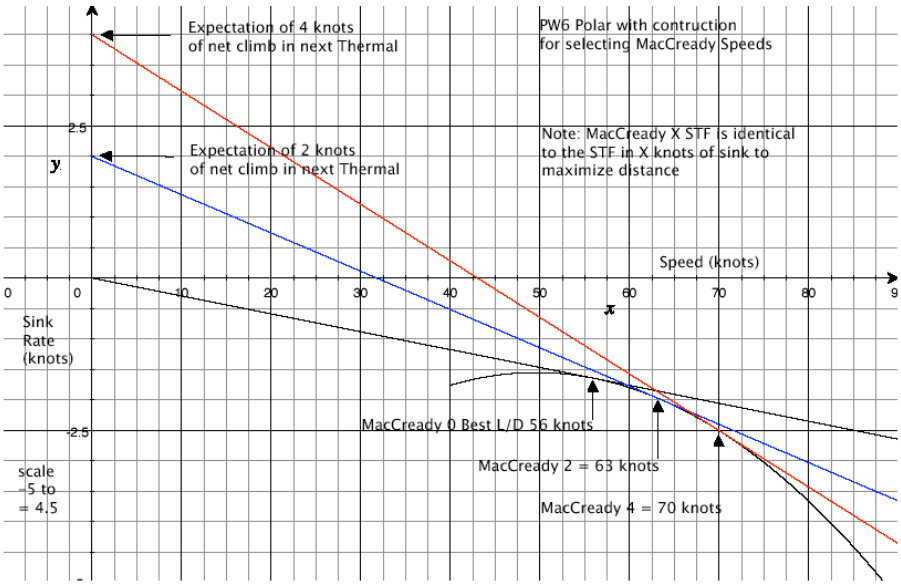

Figure 2

For X-country flight and competition, when thermal density and strength permit, MacCready flight facilitates the "extraction" of energy to maximize average speed. While the energy (altitude) consumption depends on the polar shape, the energy (altitude) required for a PW6 is typical for medium performance gliders (ie. with best L/D glide ratios of ~34). From the flight polar for the PW6 (Figure 2), the STF for MacCready 4 is 70 knots. This yields a glide ratio of ~28 .which corresponds to using 21% more altitude to go 25% faster between thermals versus flying at MacCready 0….or the best L/D speed, 56 knots. The advantage of flying at MacCready speeds is, of course, higher average speeds and shorter times enroute. The disadvantage is lower minimum and average altitude enroute, and for that reason slightly higher land-out probability. For perspective, on a 50 nautical mile cross-country in a PW6 flying at MacCready 4 (70 knots, L/D=28) versus MacCready 0 (56 knots, best L/D=34) yields the following theoretical numbers: (Assumptions: neutral air between thermals, net lift in thermal 4 knots, straight line flight, no time consumed centering thermals, ie. best case scenario).

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MacCready Flight & Dolphin Flight 101 Contd

	MacCready 4	MacCready 0	Difference	% Mac 4 to Mac 0
Energy required	9,429 ft.	7,765 ft.	1664 ft.	+ 21.4
Time to climb	23.29 min.	19.18 min.	4.11 min.	+ 21.4
Time of Glide	42.85 min.	53.57 min.	10.72 min.	- 20.0
Total Time	66.14 min.	72.75 min.	6.61 min.	- 9.0
Average Speed	45.36 knots	41.24 knots	4.12 knots	+ 10.0

Therefore, for a PW6, on a 50 nautical flight, flying at MacCready 4 is 10% faster using 21% more altitude (energy) compared to flight at MacCready 0 (Best L/D).

Dolphin Flight. Dolphin flight can be loosely defined as managing soaring flight while flying straight, or nearly straight. Like thermal flight, it comes in two flavors depending on the mission. If the goal is to maximize energy (altitude) acquisition, then, when encountering lift while flying straight, slowing down to minimum sink speed will optimize altitude gain. Conversely, when encountering sink, speed up per the tangent to the flight polar.For example, if flying straight in the PW6 in 4 knots of sink, speed up to 70 knots (MacCready 4 speed per Figure 2: red line).

On the other hand, for the recreational or contest x-country pilot wanting to maximize average speed, it can be shown once again MacCready theory applies (Reference 2, p 124-126). When encountering a region of X knots of lift while flying straight, flying at MacCready X speed will maximize average speed in the region of lift (at the expense of some altitude gain versus flying slower). To maximize speed to a destination, or around a course, it is most often desirable not to have to circle in a thermal. One technique often used by contest pilots when flying at, or close, to cloud bases, is to "zero" out altitude gain by maintaining a constant altitude and gaining speed while transitioning a thermal ie. acquiring kinetic energy instead of potential energy (often to remain legal VFR 500 feet below the cloud bases), then, upon exiting the thermal at upwards of 90 knots, executing an abrupt pull-up or so-called "stick thermal" to turn kinetic energy back to potential energy (altitude). A stick thermal from 90 knots to 70 knots will gain approximately 140 feet of altitude in ALL gliders. The conservation of energy solution is independent of weight. And, of course, 140 feet of altitude, in neutral air, in a 40 to 1 high performance ship, is worth approximately 5,600 feet horizontally (> 1 mile). Completing a task with solely Dolphin flight will most likely yield desirable results.

Summary: Paul MacCready's solution to optimizing speed in cross-country flight has provided the foundation for virtually every book, article, paper, and presentation made on cross-country soaring flight for the past nearly six decades. It applies to both thermal to thermal optimization and Dolphin flight. Depending on the mission, knowing how to optimize time aloft, distance to a destination, or speed to a destination or around a course, can only enhance results, safety, and the joy of our sport.S

Steve Platt

References:

1. The Complete Soaring Pilots Handbook, by Ann and Lorne Welch and Frank Irving, 1977 (ISBN: 0-679-50718-3)
2. "Cross-Country Soaring", by Helmut Reichmann,, 1993 (ISBN: 1-883813-01-8)
3. "MacCready Theory with Uncertain Lift and Limited Altitude" *Technical Soaring* 23 (3) (July 1999) 88-96, by John H. Cochrane

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SAFETY ISN'T THE MOST IMPORTANT THING – IT'S THE ONLY THING!