



Thermals

Newsletter of the Rocky Mountain Soaring Association

July 2000

AMA Chartered Club 1245

Volume XXIV Number 7

President's Message

It has been an unusual start to the season. Mark Howard's 2M contest was postponed due to weather and is scheduled to be reflown this month. Lenny Keer also had a rainout, but he managed to get his HL event in the following weekend. Rick Housden had a work commitment cause the postponement of the RES event. This will be rescheduled. Hopefully things will work out for the rest of the season.

It appears that holidays and other commitments have interrupted communications to Newsletter Central. Several reports are MIA this month and will be made up next month.

My work schedule has significantly interfered with my practice time and it really showed last month. It was a really bad showing and what is worse, Bob Rice managed to get his report in on time so I can't hide it. I really gotta spend more time practicing.

The response to my request for help scoring was underwhelming – exactly zero. This means that CDs must be prepared to manage the scoring themselves for events that I do not attend. I am not going to be in town for the July meeting, but I intend to hold a seminar on scoring and the AMA rules for anyone that wants to attend after the August meeting. I encourage CDs to attend.

Blue skies,

Jim – *Filling in for an MIA Shannon...*

Next Meeting:

Date/Time: July 11, 2000 - 7:00PM

Location: Heli Port Hobbies

1400 W 70 Ave

Denver CO 80221-7023

See map in March 2000 Newsletter



Rocky Mountain Soaring Association

July Open Contest Sunday July 16, 2000 CD Bob Lewan

Registration: 8:00-8:45AM
Pilot's Meeting: 8:45AM
First Round: 9:00AM
Entry Fee: \$5.00 (\$3.00 Jrs)

Current (2000) AMA membership is required.

Please be registered and have planes assembled by Pilot's Meeting

NO FLYING PRIOR TO FIRST ROUND.

Winchmasters: Please be at the field by 8:00AM. We may be putting new lines on the winches. I will let you know.

Tasks: At least 5 rounds of T1 International Duration.

Landing: L4 Spot Landing with AMA tapes.

RMSA 2M Sunday July 9, 2000 CD Mark Howard

Registration: 8:30-9:00AM
Pilot's Meeting: 9:00AM
Entry Fee: \$5.00 (\$3.00 Jrs)

Current (2000) AMA membership is required.

Tasks: Announced day of contest



Rocky Mountain Soaring Association

BEST OF THE BEST HANDLAUNCH CONTEST 5/13/2000 CD SKIP MILLER

The name of the contest "The Best of The Best" is named because of the events flown. I would run tasks only from the International Hand Launch competition and the US Nationals competition, which are arguably the the 2 best venues for Handlaunch in the US today. If you have not attended either of these meets, you owe it to yourself to try and attend, as they both are the essence of the growing segment of Handlaunch.

The event had reasonable attendance, with 11 pilots competing. I had the assistance of Barb Keer and Dusty Miller in helping with logistics and scoring. Kalman Kanyo kept the flight groups moving, being the official task timer. I decided to go over each task before the time slot, instead of at the traditional pilots meeting, as each task was significantly different. Although there is always some luck in every soaring performance, I chose those tasks that were based most on soaring skill. We began with a ladder task, with increasing increments of 15 seconds(INTL) followed by 8 longest flights, 1 minute max(INTL) and then into a 1,2,3 4 minute any order and down before the working time horn(INTL). I followed these with 5- 2minute flights with unlimited throws (NATS) and then total time 2 minute max 8 throws. I stated that if we got 5 rounds in before 1:30, I would continue on with no task starting after that time. Cash plus storage products from Wood Logic were the awards.

The day seemed to provide many challenging conditions, with light lift being the norm. It was interesting to watch how the perceived "easy ladder" task gave so many pilots a lot of trouble. The tasks where you had to land in the zone before working time expired to qualify the last flight proved challenging to some pilots, but no one over shot the slot. All in all, the events tested the pilots and many kind remarks were given as to the format .I also had an award for the top score for first timers(1 handlaunch contest or less), as well as over age 45.

Dominating from the first round with his original design, John Kappus won open, followed by Skip Miller(2nd), and Dusty Miller (3rd). In over 45, Charlie Miller held off Gary Lewan and Jack Zika for the win. In the 1st timer category, Randy Cheshire bested Joseph Newcomb in a close race. It is interesting to note that Joseph flew a Mosquito class handlaunch; a foamie just the right size for learning handlaunch as a 9 year old. Watch for him in the future.

1 JOHN KAPPUS	5415
2 SKIP MILLER	5383
3 DUSTY MILLER	5180
4 CHARLIE MILLER	4854
5 BOB LEWAN	4776
6 LENNY KEER	4739
7 JACK ZIKA	4649
8 JON PADILLA	3990
9 RANDY CHESHIRE	1574
10 JOESPH NEWCOMB	1443
11 GARY LEWAN	375



Rocky Mountain Soaring Association

Spring Fling Open Class Contest Report May 7th 2000 - Bob Pederson CD

It was a dark and rainy... Oops wrong story! It was a warm and sunny day as 24 pilots gathered at the sod farm for the June open contest. After some initial delays for the farm mowing crew to complete their tasks and concern for the sprinkler moving around to where we wanted to set up, the winches were set up and we got underway. The air was both very good (lots of lift) and very bad (couldn't get 5 minutes). With 5 flight groups, using 5 winches and the relatively long (9 minute) tasks, we were only able get in 5 rounds. Using the FAI landing tapes appeared to emphasize flying skills over landing as intended. Congrats to Mark Howard (Masters), Kevin Moffet (Sportsman), and Matt Curtis (Novice) for their first place finishes.

Bob Rice

May Contest Results

Contest Results for: June Thermals

Date: 36,688

ID	Class	Name	RD 1	RD 2	RD 3	RD 4	RD 5	Total	Norm by Contest	Norm by Class
N Novice										
14	N	Matt Curtis	288.61	869.64	842.96	427.75	204.15	2,633.10	528.86	1,000.00
S Sportsman										
11	S	Kevin Moffett	759.49	1,000.00	608.83	987.12	968.80	4,324.25	868.52	1,000.00
20	S	Phil Jones	898.73	990.55	969.60	780.17	598.96	4,238.02	851.20	980.06
16	S	John Kappus	722.50	998.44	773.00	539.34	884.08	3,917.36	786.80	905.91
17	S	Bob Johnston	696.20	1,000.00	745.00	28.90	975.78	3,445.88	692.10	796.87
9	S	Gary Lewan	607.59	568.75	773.93	674.52	793.04	3,417.84	686.47	790.39
M Masters										
7	M	Mark Howard	1,000.00	996.88	982.00	1,000.00	1,000.00	4,978.88	1,000.00	1,000.00
10	M	Jack Zika	1,000.00	989.01	1,000.00	995.69	980.94	4,965.64	997.34	997.34
5	M	Dusty Miller	1,000.00	922.83	1,000.00	1,000.00	993.08	4,915.91	987.35	987.35
4	M	Skip Miller	890.00	1,000.00	997.96	1,000.00	994.81	4,882.77	980.70	980.70
12	M	Bob Avery	977.22	860.28	994.91	985.69	1,000.00	4,818.10	967.71	967.71
13	M	Dave Meyers	987.34	988.98	1,000.00	1,000.00	699.13	4,675.45	939.06	939.06
24	M	Shannon Bingham	1,000.00	1,000.00	977.00	680.41	1,000.00	4,657.41	935.43	935.43
8	M	Bob Lewan	637.50	1,000.00	1,000.00	1,000.00	1,000.00	4,637.50	931.44	931.44
15	M	Charlie Miller	1,000.00	990.55	992.98	635.06	965.22	4,583.80	920.65	920.65
21	M	Larry Laughlin	987.34	987.50	969.60	606.77	941.18	4,492.40	902.29	902.29
3	M	Byron Blakeslee	987.34	959.38	946.30	546.49	1,000.00	4,439.51	891.67	891.67
22	M	Don Ingram	805.06	715.86	990.00	923.41	994.79	4,429.12	889.58	889.58
6	M	Lenny Keer	962.03	921.10	1,000.00	484.98	996.53	4,364.64	876.63	876.63
2	M	Bob Moffett	450.00	892.19	912.00	972.82	993.06	4,220.06	847.59	847.59
19	M	Jon Padilla	1,000.00	959.18	992.00	635.84	366.78	3,953.80	794.12	794.12
23	M	Austin Cleis	974.68	754.72	837.07	377.68		2,944.15	591.33	591.33
18	M	Rich O'Connell	987.34	617.50	515.00	264.37	552.08	2,936.29	589.75	589.75
1	M	Jim Monaco	870.89	295.31	527.58	503.58	573.91	2,771.27	556.61	556.61



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June Handlaunch Contest Results, Lenny Keer CD

The June handlaunch contest was held on June 24th. It had been scheduled for the 17th, but was postponed due to the weather. With plenty of sunshine and light breezes, it was a perfect day for handlaunch. We flew 6 rounds and some of the tasks came from the German proposals for F3K, which is the international designation for handlaunch. The tasks tended to be a little different from the usual, and some thought and strategy was helpful. It seemed that most fliers favored the more commonly flown tasks though, so I'll probably do more of that next year.

There were a few casualties during the contest. Charlie Miller folded the wing on his Spectre during a mighty launch and switched to his old reliable Monarch. Bob Kamakaze Lewan and Joseph Newcomb had an unfortunate collision. Joseph totaled the fuselage on his Monarch and wasn't able to fly the last two rounds. Hope he can find a replacement.

John Kappus seemed to find air when there was none, and won all but one of his groups to take first place. Skip Miller took second with some very consistent flying. Dusty Miller had a dismal first round, but came back from there to take third place.

Name	Airplane	Score
John Kappus	Homebrew	5893
Skip Miller	Mirage, Logic	5768
Dusty Miller	Logic	5089
Tom Gressman	Mirage, Rad	4763
Lenny Keer	Starlight, Mirage	4681
Bob Lewan	Kappus Special	4419
Jack Zika	Monarch D Lite	4275
Charlie Miller	Spectre, Monarch	4172
Joseph Newcomb	Monarch	1877



Rocky Mountain Soaring Association

For Sale

Two Maple Leaf 4's with servos, ready for receiver. Contact Jack Zika/Golden Co., 303-279-1549.

One NIB Maple Leaf 4 kit, latest iteration. contact Tom Gressman/Littleton, Co. 303-979-8073

Clearing out the hanger to make room for new toys. All in good shape except as noted.

Orion-E Sweet flying electric sailplane. 72" span, built up 2 piece wing with strong carbon D tube. V tail. Uses speed 400 or 480 motor. Very light weight and an excellent thermal machine. I'm including the micro servos installed in the ailerons. \$150 or include the geared 480 motor for \$200 See at: <http://www.nesail.com/orione.html>

Avocet E Fast hotliner electric sailplane. All composite construction.....carbon/foam wings and removable V tail, and fiberglass fuse. Flies on 7 to 10 cells and 05 to 15 motor. Wing is cracked and needs a patch of glass (easy repair) but I didn't want to mess with it so it's going cheap. Airframe only \$75 or with 3 servos installed \$125. See at: <http://www.nesail.com/avocete.html>

Orion HLG Very nice flying handlaunch. Built up 2 piece wing with carbon D tube, fiberglass fuse, conventional tail feathers with removable stab. Great for traveling. Has throwing peg and towhook. See at: <http://www.nesail.com/orion.html> \$100

Sunbird HLG Own a piece of history. This is the updated kit of Dave Thornburg's original handlaunch. Nicely built and covered in transparent red and blue. \$100

T-33 Electric ducted fan jet. Has some dings and repairs, but is structurally sound. Includes stock motor and fan. \$70 or including two 8 cell 1000SCR batteries for \$100

Butterfly Very aerobatic electric fun fly plane for speed 400 motor. Weighs 12 ounces. I'll sell it ready to fly including the motor, speed control, two servos (HS-50) and receiver (555) for \$180, or just the plane and motor for \$50 See at: <http://www.nesail.com/avocete.html>

Lenny Keer
Lenny970@aol.com or (970) 352-1194



Rocky Mountain Soaring Association

HLG Optimization

Following is an article published on the internet by World Champion Joe Wurts in response to a question about his method for optimizing HL parameters. Enjoy!

In short, my analysis tools were: Excel, a vortex lattice code, and an airfoil design and analysis tool that is highly regarded in the aero industry. I used some custom Excel stuff that is formulated to help out in digesting the results from the vortex lattice and airfoil tools. Not very difficult to put together, just the typical eqns, along with some macros and VB. Not anything that is terribly user friendly, but enough for me to do the job.

As you probably know, setting up the constraints, and the objective evaluation functions is really the difficult task. All else is just math.

As for the piece parts, the wing planform design is optimized considering spanwise lift distribution to get good handling qualities, along with good overall total lift and drag efficiency. This is somewhat intuitive in nature, one has to look at the local lift coefficients along the span in order to arrive at the "handling qualities" part of it. The rest of the stuff is more objective.

In addition to the handling qualities, one needs to get a good e (Oswalds efficiency) out of the planform, along with a high useful total lift coefficient (total wing C_L /local C_L). The latter is somewhat in opposition to the handling qualities, but manageable. Also, one should be taking into account the varying local Reynolds number along the span in formulating the total aero characteristics of the wing (lift and drag).

Also included in the wing optimization process was the weight of the wing. As a first order approximation, the wing weight is a function of the area (skin weight at minimum gage), volume (foam cores for vacuum bagging), along with a second order influence due to total thickness (thin high aspect ratio wings need more spar structure). The spar structure is really not as much of a driver for HLG as one would think, but should be included.

As for the tails, a simple trade on tail boom length vs. tail size was made, with a simplistic boom length vs weight eqn, along with tail area vs tail weight eqn.

Functional goals included optimizing the minimum sink, mid-range cruise speed L/D, and very low C_D profile drag. Defining a useful objective function here is not a trivial task, and will be left up to the reader.

Variables that were traded for the optimization include: planform airfoil(s) wing area tail boom length TE angle as applicable TE length as applicable

Fixed values include: Radio gear weight (2ch differing from 4 ch) wing span tail volumes nose pod weight

Qualitative ratings include: spanwise local lift distribution $c_l - c_d$ bucket width with TE deflections

Constraints include: airfoil thickness (at servo and and TE)

The process is highly iterative in nature. I started off with using an Encore type HLG to get me the scaled Re 's along the wing. After getting this, I started whacking at the airfoil development.

After developing a few candidate airfoils for evaluation, the planform was brought into consideration for a round of optimization. With the "optimized" airfoil, I did a planform optimization using the developed airfoils. In the case of the poly ship, I ended up doing another round of airfoil optimization, as the optimal aspect ratio increased, driving down the wing area which pushed for another bout of airfoil optimization.

This design/analysis/optimization loop is fairly straightforward for the poly ship, but grew some hair for the 4 ch ship. The additional variable of TE deflections added considerably to the design cycle. Also, it made for more qualitative evaluations. Airfoil 1 might produce a better peak efficiency, but airfoil 2 might produce a wider "bucket". Which is better? And how wide should that bucket be to be considered optimal?

There is a reason why nobody is selling a program that has an optimal airplane design button. There are just too many qualitative judgments that go into a realistically constrained design.

After the first few orbits around the design loop, I tossed in the tail boom optimization as well, and went for another orbit. The result, the toys that I flew at Poway. The poly ship did not get the tail boom iterated, and the 4 ch ship was a bit shorter compared to the optimal, but the min sink sensitivity was really flat between the chosen length and the optimal length. Note: optimal really should have quotes around it. It was optimal by my evaluations, objective functions, and constraints, but might not be optimal by another's evaluation.



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Now, you ask my opinions on some of the "skinny" type platforms that are showing up out there. First, I'll make a note on the poly ship that I defined. I intentionally finished with about 15 - 20% more wing area than the theoretical optimal solution, as the sensitivity was really flat, and I wanted to have a bit more "spare" Cl for maneuver capabilities. I lost about 1% in the hang time in order to pay for this, something that I thought was a reasonable trade. It turns out that one can get almost the same overall result over a fairly large area range via trading airfoil for chord length (wing area). So, just what is best? Dunno... just gave it my best shot. The challenge with the real high AR type solution on a poly, is that the airfoil has to compromise more at the very low Cl (high speed) region. As these toys were aimed at the Poway type conditions, I chose not to go that route. Also, I have a pretty high speed throw, so minimizing the drag for the throw condition is pretty important to me, but might not be quite so valued for another.

For a high AR 4 ch wing, I'm quite worried about the aeroelastic and flutter issues. It is quite difficult to get sufficient torsional stiffness to survive at 80 mph without flutter. I have not seen a good solution here yet. Fortunately, my numbers did not lead me to have to solve this one, as I got pointed to a lower AR solution.

Now, to the very long tail booms. I'm a fan of compromising somewhere in the middle for the tail boom. My optimizations show that going too long is just as bad as too short. But, I've tossed in a weight penalty for the longer booms that is derived via the required total stiffness to preserve a similar aeroelastic structure. Some of the long tail boom configurations out there are unsuitable for me in the wind due to aeroelastic issues. They work very well for many, but I think that I might be getting to too high of a throw speed in the wind. Also, the handling qualities get a little "different" for my taste. Due to the large damping from the long tail boom, one needs very high control deflections compared to a shorter tail boom to get the same pitch or yaw rate. Might be a personal thing, but it does not feel right to me.

Now, for some things I noticed during the process.

For airfoils, in the low Re regime that HLGs play at, it is hard to get the thickness and camber far enough forward. I discarded some airfoils due to a lack of construction capability. In fact, the airfoil used on the 4 ch bird was initially discarded as I did not think that it could be built successfully, but Phil somehow made it happen. I had designed up a series of different airfoils that went from root to tip in order to fit the servo, get enough TE thickness for control surfaces, and suitable spar thickness, but we did not end up using them.

The 4 ch airfoil had the max thickness and camber even farther forward than the poly airfoil. I jokingly call it the "flat top" airfoil, as there are only small amounts of curvature in the aft 60% of the upper surface. A little bit of creative shaping near the hinge line can pay off as well, but steals even more from the TE thickness.

Both airfoils had a far blunter LE than the 6063 does. I did a little check on my now old 6063 Encore, and it turns out the the LE on it was blunter than it should be. Maybe that is one reason that I really liked it, it was already headed towards the right direction...

The wing planform also had a pretty low sensitivity to the "safety" value (the rolloff of local cl vs. spanwise location). The higher the safety value, the higher the tip Re , which pretty much paid for the reduced span efficiency and then some. Where it lost was in the total lift capability before the wing root got out of the drag bucket. There are lotsa trades that can be done here with using airfoils varying vs. span in order to tailor the airfoil $cl - cd$ bucket to match the local requirements, but one tends to lose on the edgess of the flight envelope. My multi-airfoil 4 ch wing design is in this vein.

The bottom line, after all this typing: The design/analysis/optimization routine is highly dependent on your definition of your explicit and your unknown implicit constraints. It is the unknown implicit ones that hamper your finding the next breakthrough in design. It was a lot of fun and work to go through this process, and it enabled me to understand and develop sufficient tool sets and knowledge to attack the far more complex tasks of designing an F3B and F3J ship. Stay tuned for further details on these.

Regards, Joe Wurts

PS All of the above opinions are mine, and are quite likely not applicable to many. IMHO, The design process above resulted in high performance thoroughbreds, and might not result in the optimal fun fly HLG. That said, they are less extreme than the 6063 Encore (easier to fly, more forgiving, and more performance).



Rocky Mountain Soaring Association

2000 RMSA Contest/Event Calendar

Date	Event	CD	Notes
Jan. 4	RMSA Meeting		
Feb. 1	RMSA Meeting		
Feb 4-6	<i>Southwest Classic</i>		<i>CASL Southwest Classic - Phoenix AZ</i>
Mar. 7	RMSA Meeting		
Mar. 12	Open*	Lenny Keer	
Mar. 19	Pro-Am	Jim Monaco	Third annual Pro-Am
<i>Mar. 26</i>	<i>PPSS - Open</i>	<i>Joel Zelmer</i>	<i>March Madness</i>
April 2	E-ZAGI Fun Fly	Lenny Keer	
Apr. 4	RMSA Meeting		
Apr. 9	Open*	Jim Barr	
Apr. 16	HLG**	Shannon Bingham	
<i>Apr. 23</i>	<i>PPSS - RES</i>	<i>Greg Tarcza</i>	<i>Humps 'n Bumps</i>
April 30	2M*	Mark Howard	Restricted to 2 meter models
May 2	RMSA Meeting		
May 7	Open*	Bob Pederson	
May 13	HLG**	Skip Miller	Saturday event
<i>May 20</i>	<i>PPSS - Open</i>	<i>Austin Cleis</i>	<i>May Fly Contest</i>
May 21	E-ZAGI Fun Fly	Lenny Keer	Another attempt
May 27-28	F3B	Mark Howard	National Level Open
<i>June 3-4</i>	<i>IHLG</i>		<i>International HL Contest Torrey Pines CA</i>
June 6	RMSA Meeting		
<i>June 10</i>	<i>PPSS - 2M</i>	<i>John Read</i>	<i>First Annual Memorial Cup</i>
June 11	Open*	Bob Rice	
June 17	HLG**	Lenny Keer	Saturday event
June 18	RES†	Shannon Bingham	Rudder/Elevator/Spoiler only
<i>June 24</i>	<i>PPSS - RES</i>	<i>Jack Dech</i>	<i>Summer Solstice</i>
July 1	RES†	Rick Housden	Saturday event - Rudder/Elevator/Spoiler only
July 9	2M	Mark Howard	Rescheduled 2M event
July 11	RMSA Meeting		
<i>July 15</i>	<i>PPSS- HLG</i>	<i>Rich O'Connell</i>	<i>Upchuck HLG</i>
July 16	Open*	Bob Lewan	
<i>July 23</i>	<i>PPSS - Open</i>	<i>Dave Meyers</i>	<i>Height'o the Season</i>
Aug. 1	RMSA Meeting		
<i>Aug. 5</i>	<i>PPSS - Night Fly</i>	<i>Frank Deis</i>	<i>Any expendable plane</i>
Aug. 6	Open*	Jim Monaco	Kinda-F3J
Aug 13	HLG**	Bob Lewan	
<i>Aug. 20</i>	<i>PPSS - RES</i>	<i>Bob Avery</i>	<i>Dog Daze</i>
Aug. 27	2M*	Mark Howard	Restricted to 2 meter models
Sept. 5	RMSA Meeting		
Sept. 10	Open*	Mike O'Hearn	AKA: Colorado Challenge Cup
Sept. 16	RES†	Rick Housden	Saturday event - Rudder/Elevator/Spoiler only
<i>Sept. 23</i>	<i>PPSS - Open</i>	<i>Mike Fritz</i>	<i>Soar Bash</i>
Oct. 3	RMSA Meeting		
<i>Oct 7-8</i>	<i>Visalia</i>		<i>Visalia California</i>
Oct. 15	Open*	Shannon Bingham	
<i>Oct. 21</i>	<i>PPSS - RES</i>	<i>Milt Woodham</i>	<i>Witches Brew</i>
Nov. 7	RMSA Meeting		
Nov. 12	Open	Bob Rice	
<i>Nov. 19</i>	<i>PPSS - Open</i>	<i>Jerry Murphy</i>	<i>Turkey Shoot</i>
Dec. 10	Awards Banquet		

*Club Open points contest ** Club HLG points contest † RES Triad Points
 Italics indicates major national level contests available for points and PPSS events



2000 Board Members

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Member Support

<http://rmsa.aurorahead.com>

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Librarian:	Tracy Cochran	(303) 934-8838	Tcochran@idcomm.com
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Winch Masters

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Bob Moffett	(303) 426-0328	Rtm0007@aol.com
Shannon Bingham	(720) 304-7474	binghams@boulder.earthnet.net
Gary Lewan	(303) 277-1375	



Directions to Field

Take I-76 to exit 16. Turn left and follow the frontage road through the circle onto 120th eastbound towards the airport. Take 120th East to Tower Rd. Continue straight through traffic light and look for the sod sprinkler on the left. We are on the southwest corner of that part of the sod farm.

Flying for RMSA members and accompanied guests only.



Rocky Mountain Soaring Association
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First Class Mail

Forwarding Address Requested