Radio Controlled Soaring Digest

July 2013 Vol. 30, No. 7

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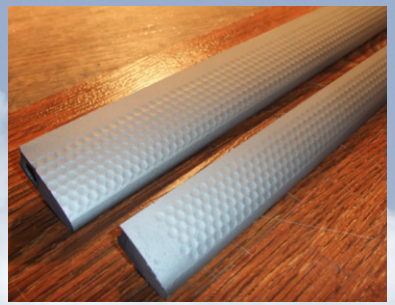
Front cover: The cover photo is a composite of a Let Minimoa flying at the 2008 Silent Knights Soaring Society Aerotow, Newark, Delaware, superimposed on a "bird" cloud photographed above the flying field the same day, August 23. Sailplane owner/pilot: Steve Richman Photography: © Alan J. Wasserman, Nikon D200

Back cover: New England Aero Tow 2013. Photo by Jeff Duhaime Canon EOS 60D, ISO 100, 1/640 sec., f10.0, 126mm



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In the Air

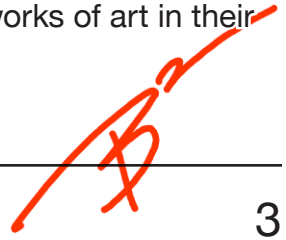
Our sincere thanks to Yury Adveev and Boris Sergeev for making publication of "A Surprising Bit of Wing Aerodynamics" in *RC Soaring Digest* possible. Although centered on the wing aerodynamics of models in the FAI F1 Class (Free Flight), the experimental data shows relevance to the RC-HLG flight regime and other low Reynolds number applications, and will certainly encourage interest in further experimentation.

As long-time readers may remember, there was a time when *RCSD* was produced through various photocopying techniques. Originally a small 8.5" by 5.5" of 16 pages, *RCSD* over the years evolved into a larger format (8.5" by 11") publication, but always reproduced in black and white. The March 2004 issue was the last of the printed and mailed copies of *RCSD*, and the rather quick transition to downloadable color PDF was complete. (The October 2003 issue was the first to be made available as a color PDF.)

The move to color had a number of benefits, the most notable being an influx of high quality photographs, first as prints derived from film camera negatives, then a rapidly increasing number of digital images, to the point where all of the images in *RCSD* are now from a digital source. We almost always reproduce photos without any manipulation on this end except for cropping, and this is a true reflection of the photographer's skills rather than the capabilities of some piece of computer software.

As you look through this issue and admire the products of manufacturing firms and the handiwork of modellers, we encourage you to admire the photographs themselves as works of art in their own right.

Time to build another sailplane!



A Surprising Bit of Wing Aerodynamics

by Yury Avdeev, translation by Boris Sergeev, bsergeev@gmail.com

I would like to share the results of a study conducted by a group of enthusiasts at the National Aerospace University (KhAI) in Kharkov, Ukraine.

Everybody knows that the golf ball, with its dimpled surface, flies much farther than a smooth ball. This phenomenon has long haunted me and others. KhAI staff kindly gave us an opportunity to do some wind tunnel research, for which they deserve great gratitude! Special thanks to the head of the aero-hydrodynamics department Vitaly V. Chmovzh for his support and expert help.

From the beginning, we naively thought that the reason for the ball high flight distance was drag reduction. [Photo 1]

In order to confirm or refute this, were produced two wing models with the same airfoil and different only in the surface finish - one smooth, the other dimpled (both top and bottom). [Photos 2, 3, 4 and 5]

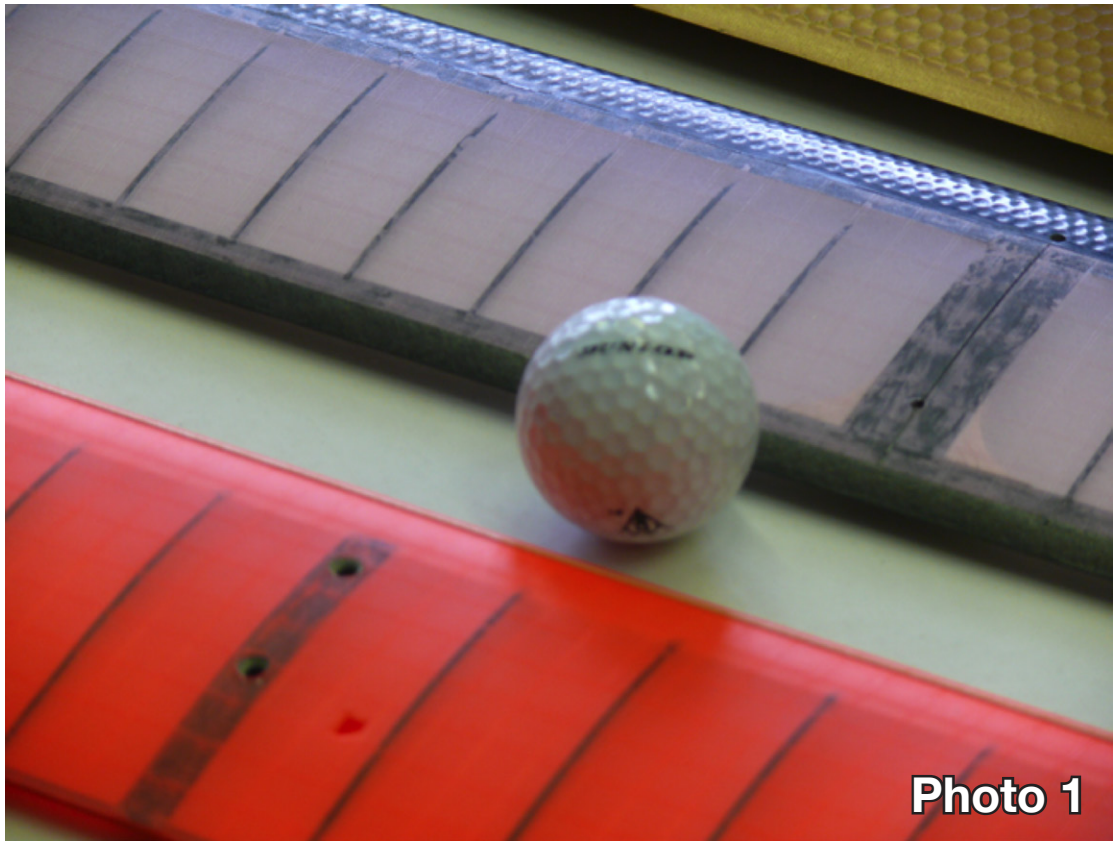


Photo 1

Yury Avdeev lives and works in the second largest city of the Ukraine, Kharkov (also spelled as Kharkiv). This city is the home of most of the Ukrainian model airplane manufacturers, including Vladimir's Model, maker of the Maxa, Supra, AVA, Blaster and others. Most people involved in the design and manufacturing of these sailplanes have graduated from the Ukrainian National Aerospace Academy, formerly known as Kharkov Aviation Institute. The research described in this article was done in wind tunnels of this institute.

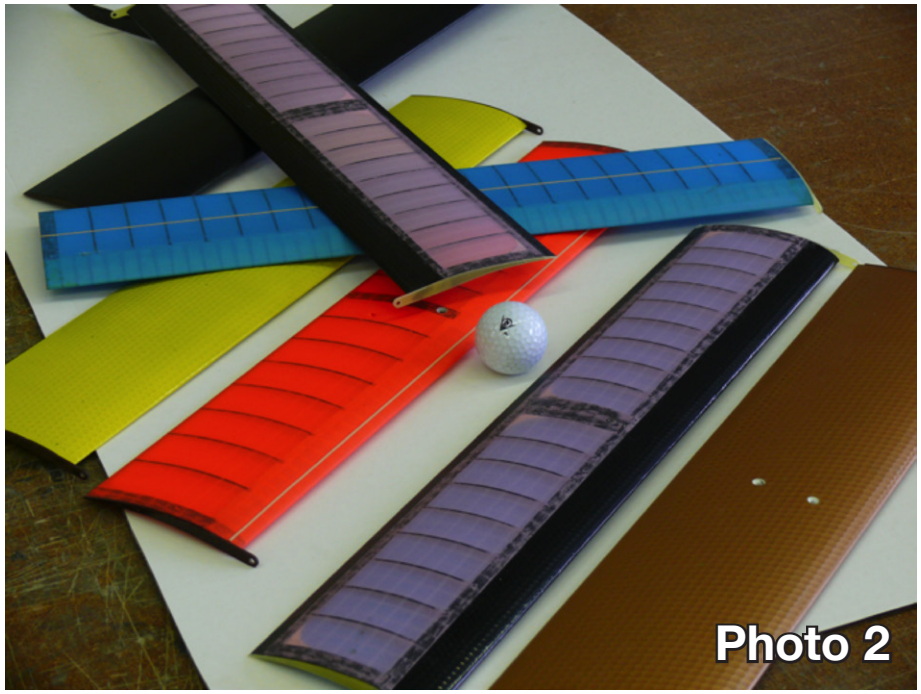


Photo 2

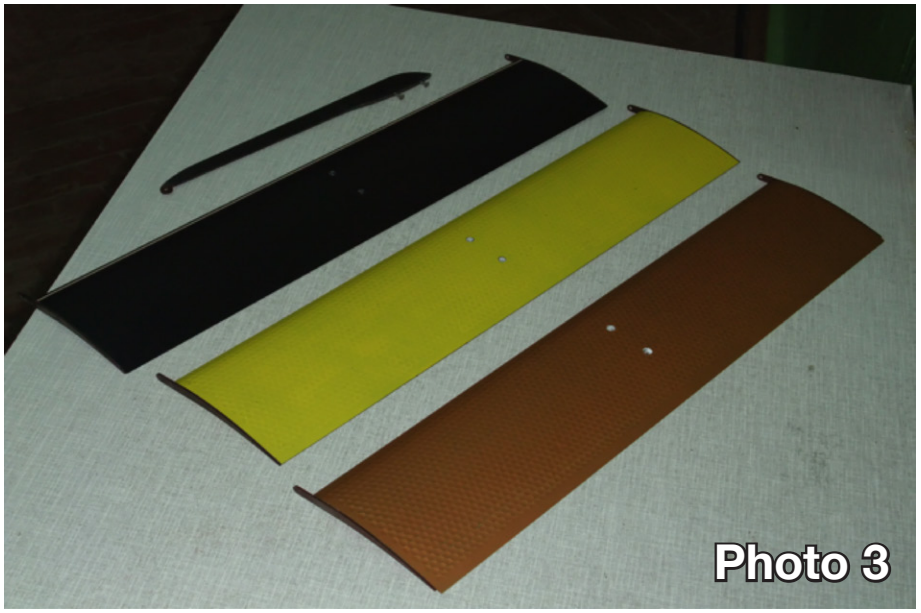


Photo 3

Photo 4

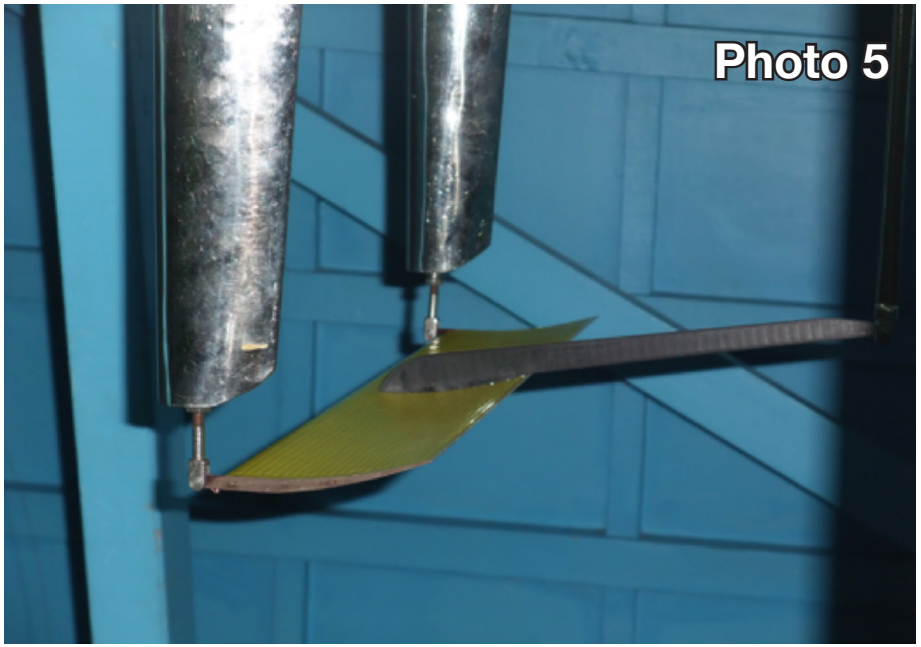
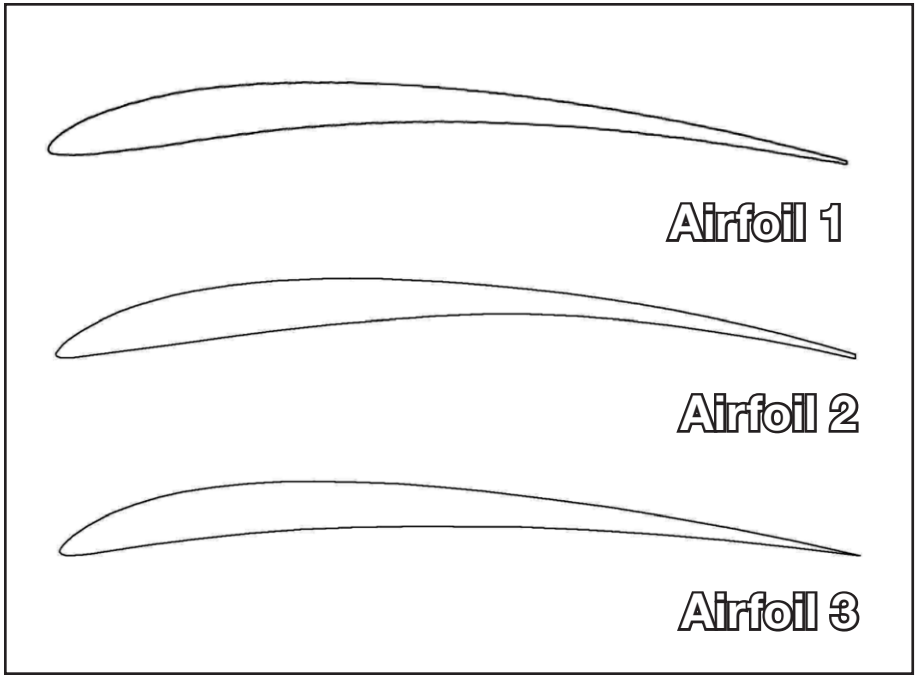
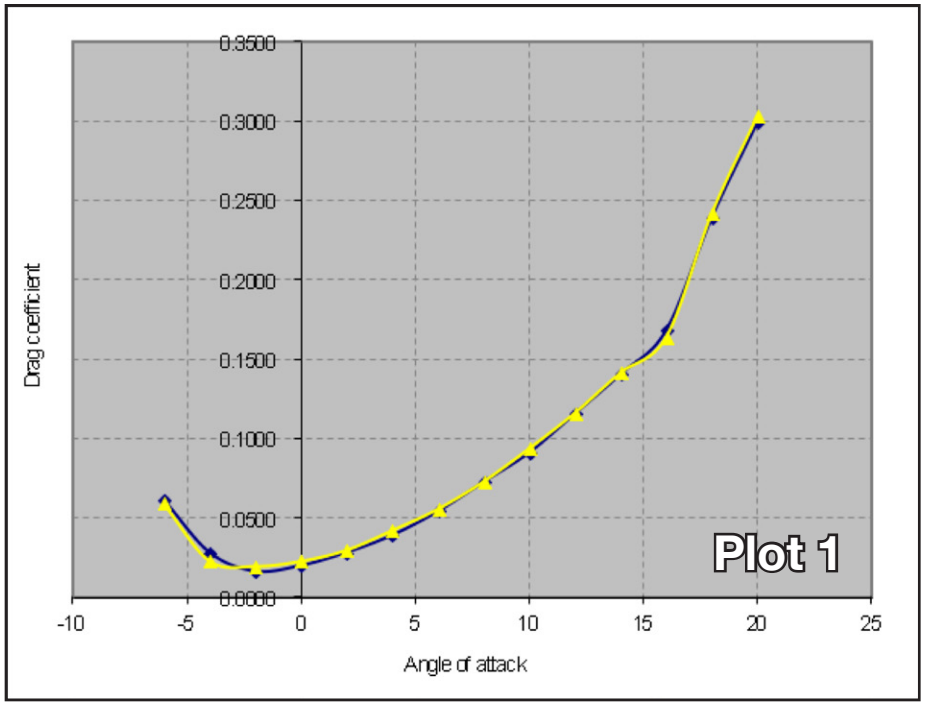


Photo 5





For the airfoil, we chose a flying model 6457, proposed by Victor Isayenko in 1981. [Airfoil 1]

Two airfoils, Makarov – Kochkarev and Benedek 6356b, are shown [Airfoil 2 and 3] for visual comparison (sorry for possible inaccuracies, these illustrations were taken from trophy templates).

Despite our expectations, the wind tunnel testing showed no noticeable change in drag. [Plot 1}

Some members of our team were deeply disappointed (they said we were wasting time on nonsense). I must admit I was disappointed, too. But, for some mysterious reasons, the dimpled wing showed increased lift coefficient (Cy) at low speeds (V = 3...5 m/sec). This statement is not very scientific, but I intentionally avoid terms like Reynolds numbers not to discourage casual readers. Sorry, aerodynamicists.

Fortunately, Vitaly Chmovzh insisted on continuing testing. Someone suggested that dimples act simply as artificial turbulators. That was a very simple proposal: glue a “trip strip” turbulator onto the smooth test wing and compare it with the dimpled one. This should had provided answers to all the questions, but it didn’t. There was no difference between the results for the smooth wing with and without the turbulator! I gave up (the flying season was about to begin).

At this moment, several students joined our efforts and, to give them credit, not without results. One Summer morning, I got a phone call and was told “Guys, you are placing the turbulator incorrectly, totally off!”

The students performed serious study on optimizing the shape and location of the turbulator on the wing. It turned out that most turbulators we see at the flying fields are simply ineffective, they serve only to follow traditions or to sooth the soul. Efficient (for this airfoil) is 0.6 mm thick

rectangular cross-section turbulator located at 7% mean aerodynamic chord, MAC, from the leading edge.

The thickness and location of the turbulator are very important. When its thickness is reduced to 0.5 mm, the effect of the turbulator vanishes and when the thickness is increased to 0.7 mm, drag starts to grow. This is obviously related to the boundary layer thickness, but it's merely my guess.

If the location of the turbulator is shifted by more than 1% of MAC (that's merely 1.5 mm at the wing root), the effect of the turbulator disappears. This is also an overly vague statement, the turbulator is either "present" or "absent." But this doesn't mean that it is useless. Just the opposite: after long and creative research, we managed to increase the critical angle of attack by 7%, which lead to the corresponding increase of Cy(max) by almost the same amount.

It was the time to compare the smooth wing equipped with a turbulator against the dimpled wing.

Surprise! The dimpled wing increased the critical angle of attack by 12% without any "creative research."

We then made a built-up "soft" wing with dimpled D-box from LE to the wing spar. Same result. This makes it easier to design and build wings, since only the D-box needs to have dimples and the rest of the structure may remain traditional with wing ribs, soft covering, etc. [Photo 6]

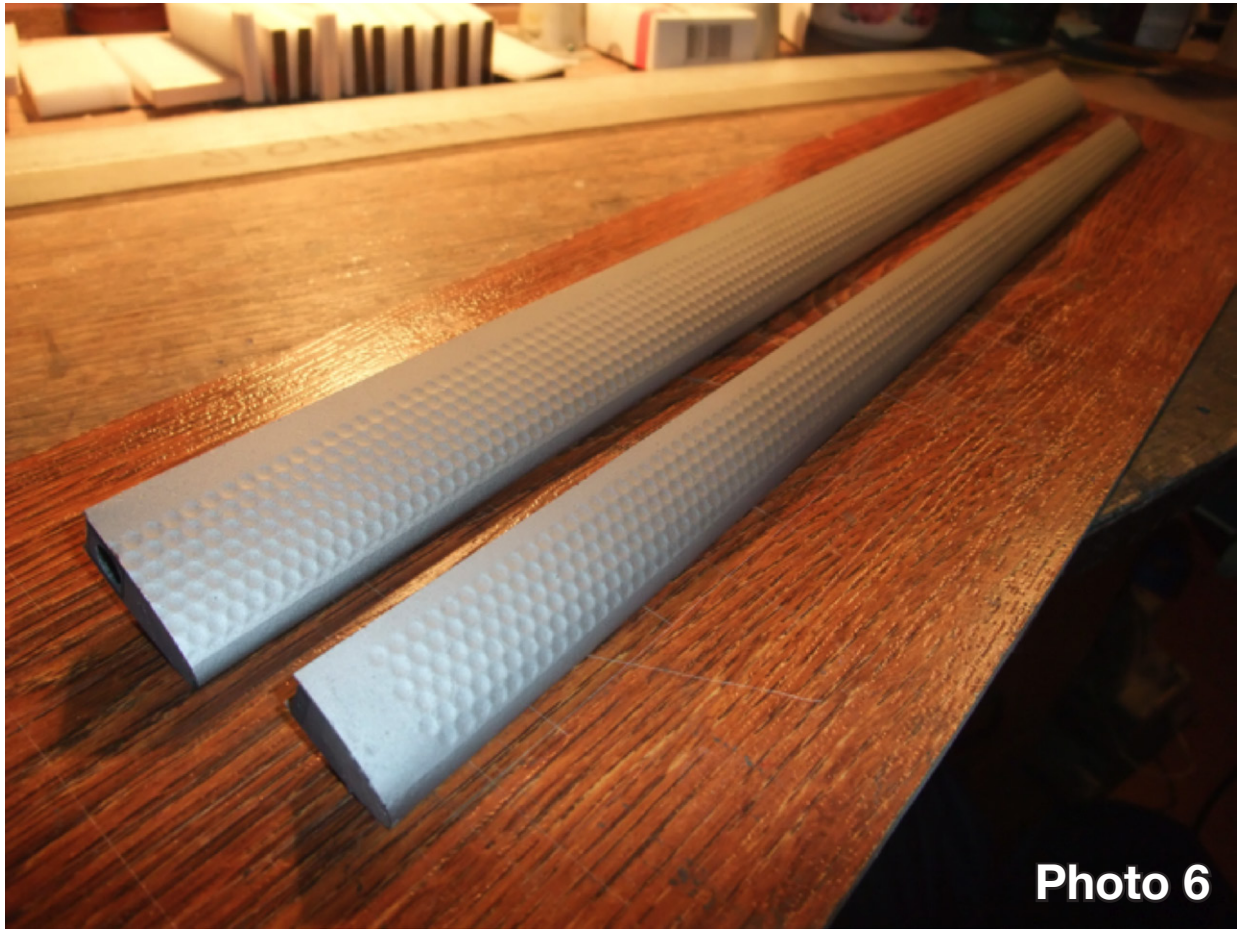


Photo 6

I must put the end to numerous disputes over significant aerodynamic advantages of "hard" wings: there are NONE. Our equipment could not detect this "substantial" difference. I am not trying to disregard the advantages of hi-tech rigid wing structures, which amaze me. Their high structural stiffness allows for aggressive starts impossible with soft wings. I am only quoting wind tunnel results which show that, even at higher speeds (in excess of 20 m/sec), when soft wings develop their characteristic buzz, there's no drag increase compared to the rigid wings.

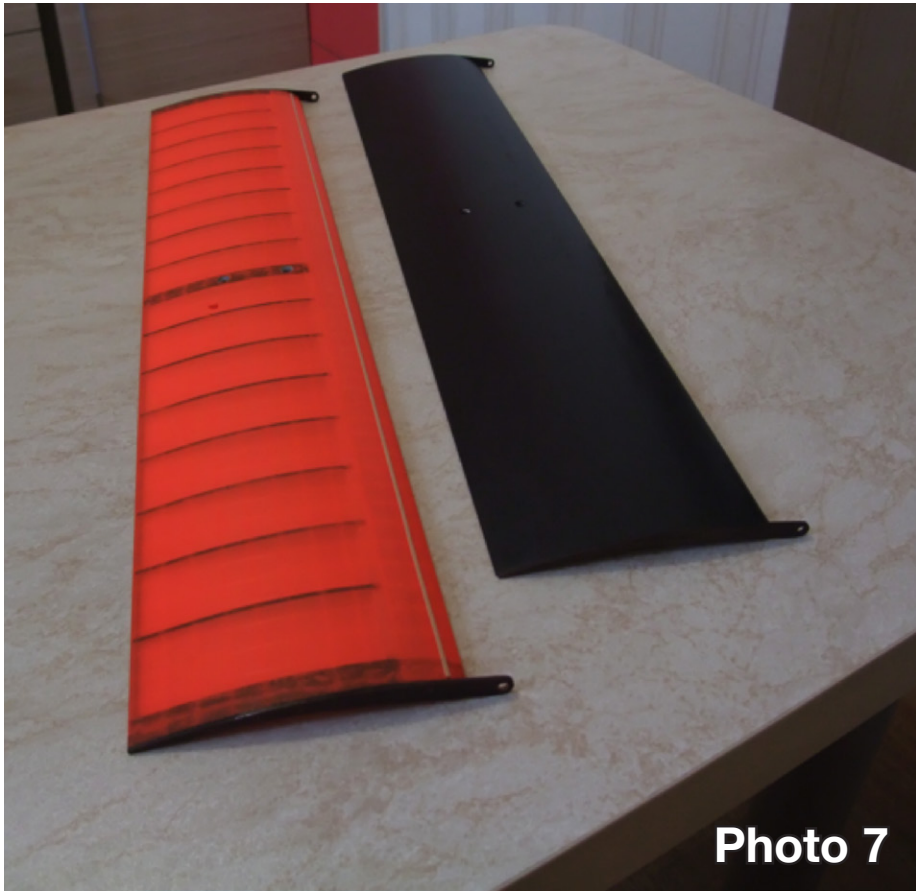


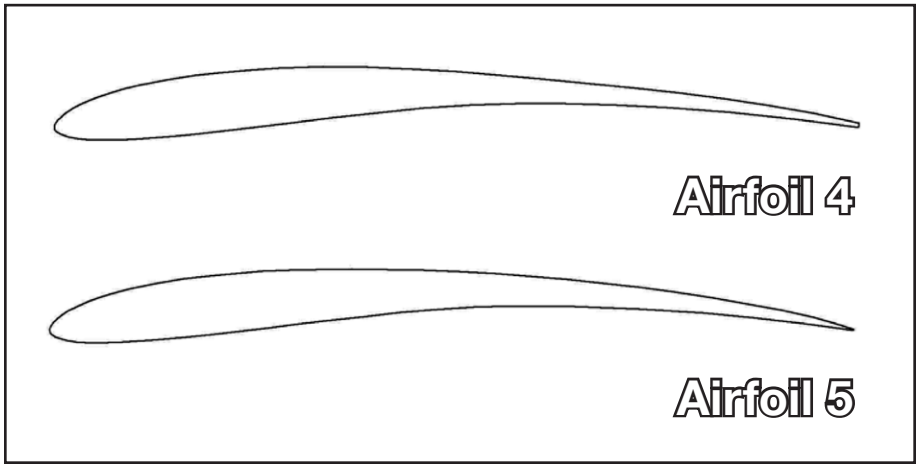
Photo 7

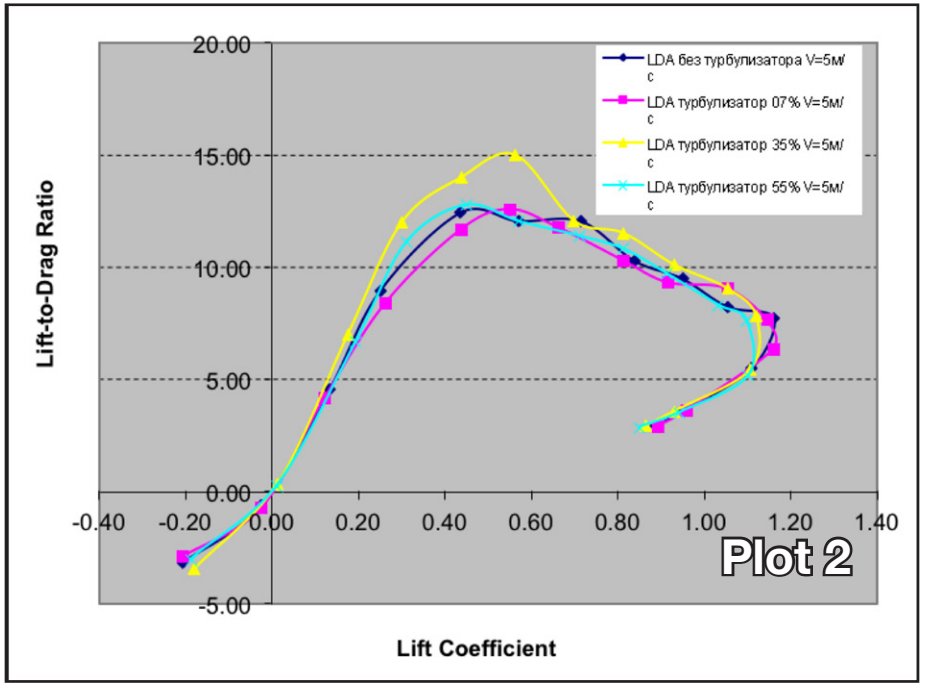
All my attempts to present these results are met with the same question, “But how about laminar flow airfoils?” As a person without an answer, I reply “This is a good question.” Having summoned the courage, I built two more wings (both with soft covering) [Photo 7] with the airfoil proposed by A. Trofimenko. [Airfoils 4 and 5]

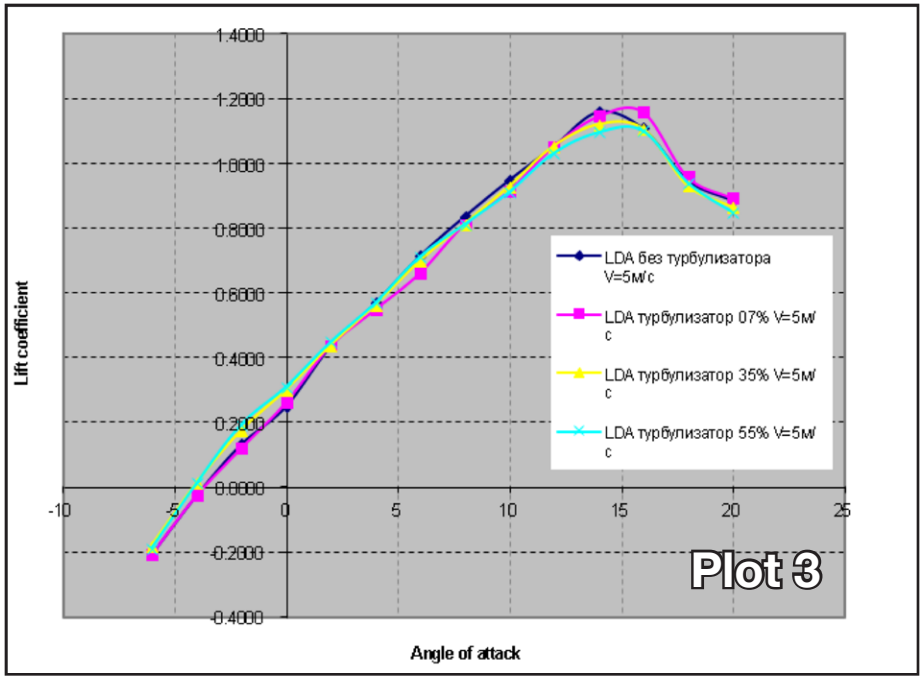
The search for the optimal turbulator location caused doubts about the expediency of its use for this airfoil series. The picture does not even need comments. But dimples, oddly enough, have the same effect as for the classic airfoil series.

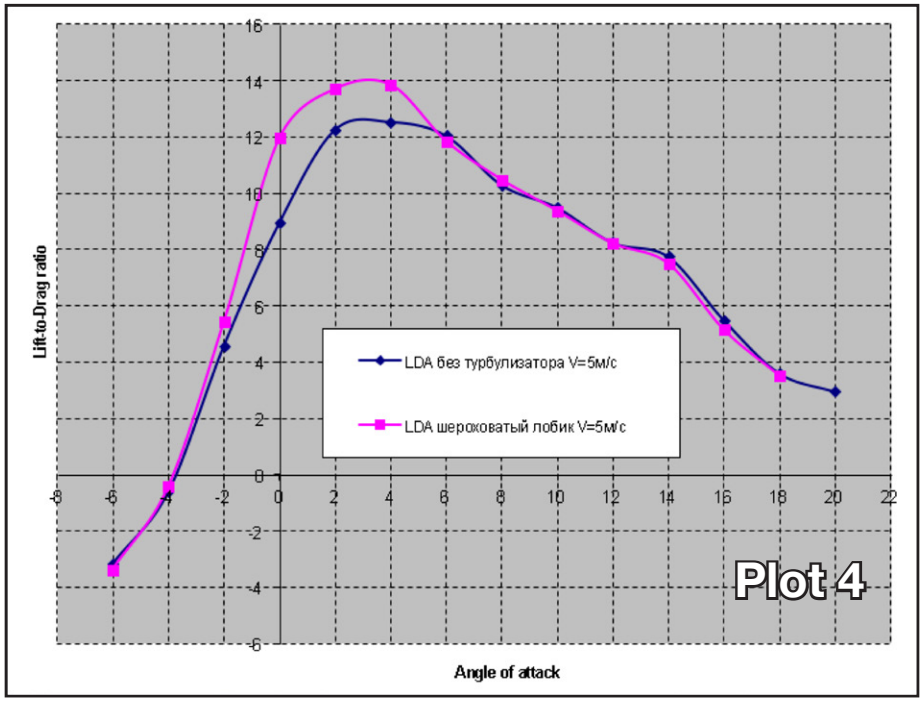
[Plots 2,3 and 4]

No less interesting were experiments on the effect of the TE thickness on the aerodynamic characteristics of the airfoil. Actually, this question should not cause any doubts (of course, a sharp edge is better!). But, due to the well-established wing designs, we disregard these, seemingly small, imperfections.









Originally, we didn't intend to study the effects of TE thickness at all. The theme emerged, one might say, by accident: one rigid wing was built with a small flaw, an overly thin TE, so, we had to build another wing. We didn't want to throw the bad wing away and it was left on the shelf in the dark corner of the shop until the lead researcher decided to test it in the wind tunnel.

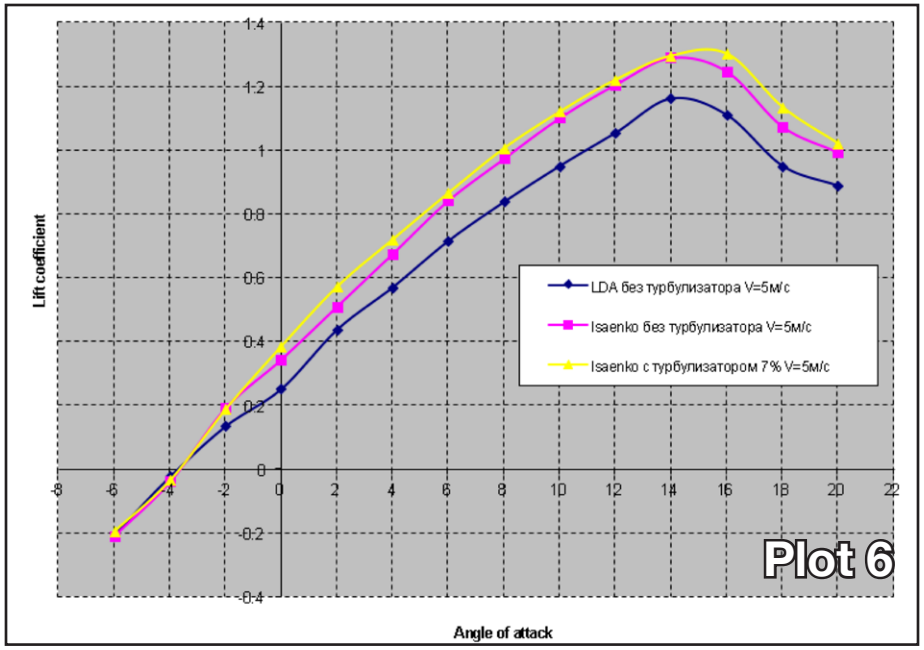
I objected to the silly work: "Nobody would make such a thin TE with traditional design wings (which make up the vast majority), since it is too difficult to do." Protracted confrontation was defused by Grigory Gorbach from Russia, who unexpectedly announced his intention to build a rubber powered model with sharp trailing edges.

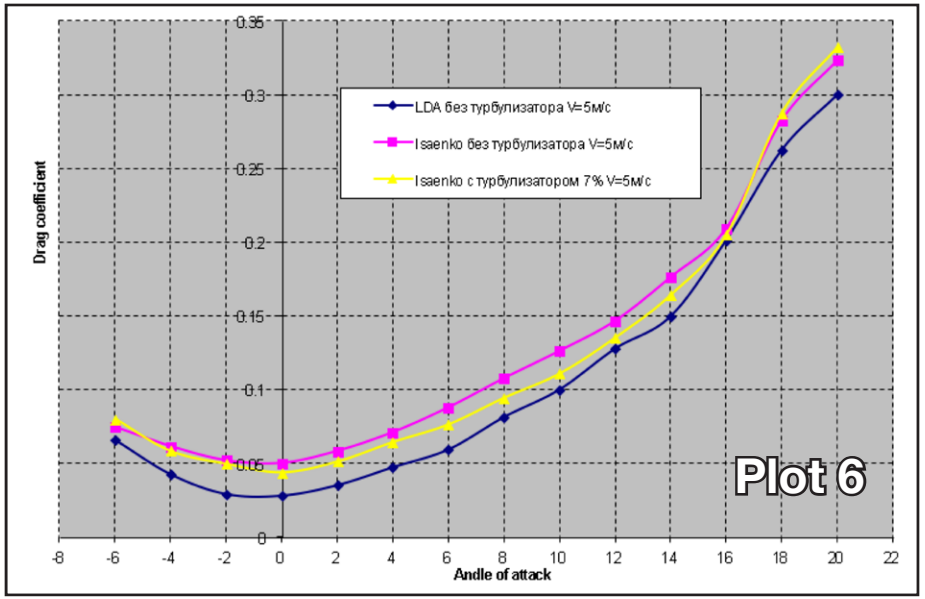
We decided to test this wing, just to prove that this was a silly idea. The result, to say the least, was impressive: a light shock, silence, and a question: "Guys! Are we looking at the right numbers?"

The difference of drag for two identical wings (both with classic airfoil) differing only in the trailing edge (0.6 and 0.1 mm) was 11% at a speed of 25 m/sec. In the case of laminar flow airfoils, this difference is 28%.

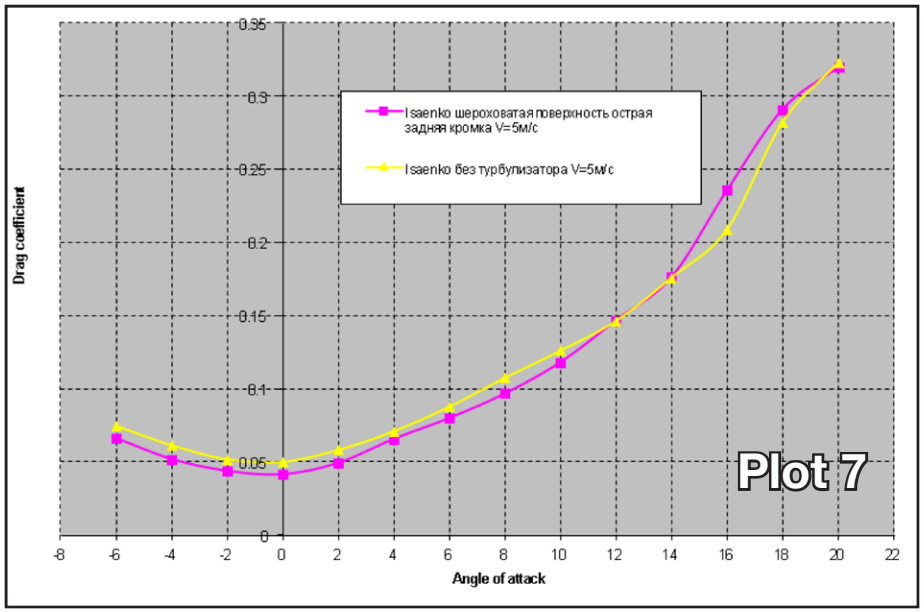
This is understandable: the laminar flow airfoils have much lower profile drag than airfoils of classic series. In our case, it seems to depend only on the thickness of the trailing edge as well as the wing span and, in a first approximation, it can be considered constant. Therefore, its share in the case of a low drag object is so great. {Plots 5, 6, 7, 8 and 9]

Plot 4: Blue line is for the smooth wing, magenta denotes the wing with dimpled D-box.

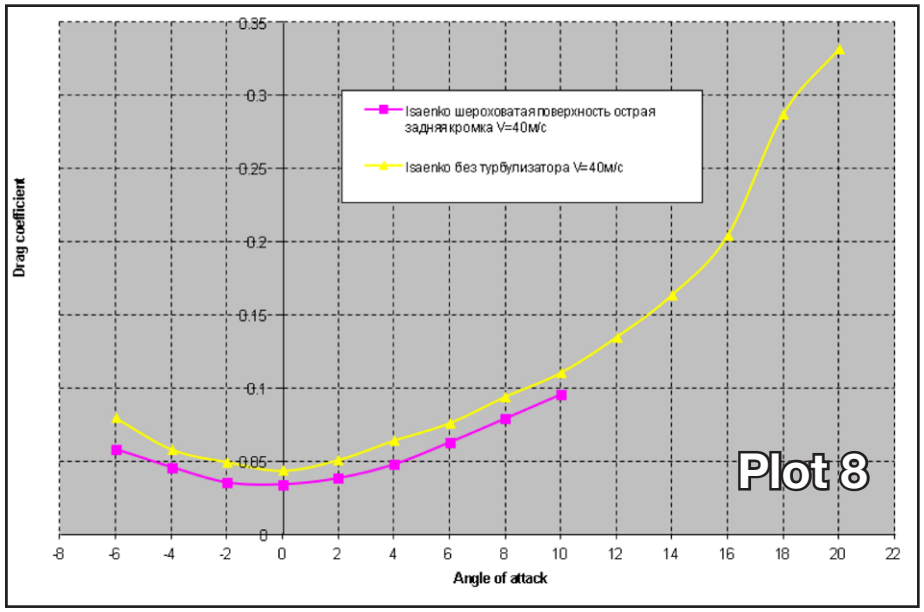




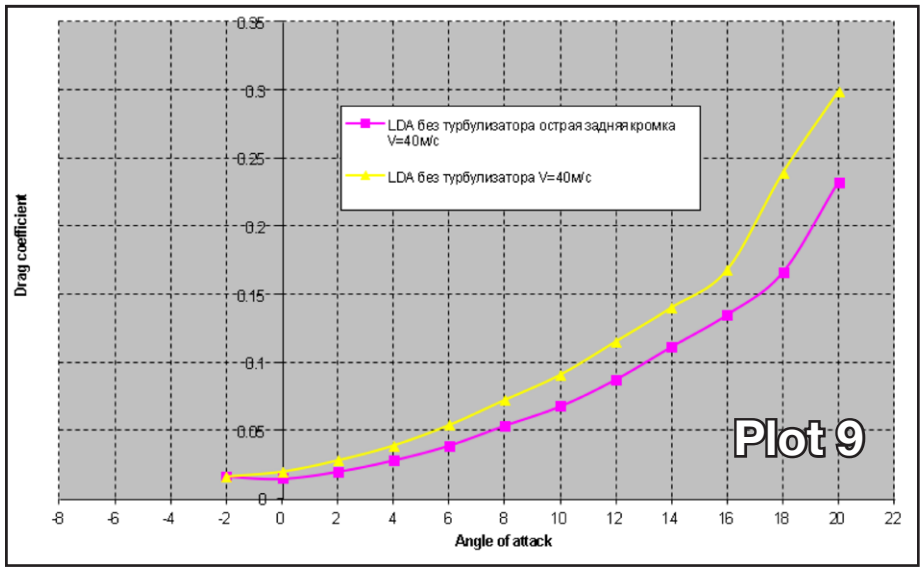
Plots 5 and 6: The blue line is for the smooth wing with low drag airfoil, magenta denotes wing with Isayenko airfoil without turbulator, yellow denotes wing with Isayenko airfoil and turbulator at 7% MAC.



Plot 7: the magenta line above is for dimpled wing with Isayenko airfoil and sharp TE, yellow denotes wing with same airfoil and no turbulator.



Plot 8: The magenta line above is for dimpled wing with Isayenko airfoil and sharp TE, yellow denotes wing with same airfoil and no turbulator. The magenta curve is incomplete in Plot 8 because the wing was destroyed during testing.



Plot 9: The magenta line is for smooth wing with low drag airfoil and sharp TE, yellow denotes wing with the same airfoil and no turbulator.

I should note that several models with all these innovations are already built and are undergoing flight testing. Much to my chagrin, the model of the godfather of sharp trailing edges flew away this February because of a timer malfunction.

- Igor Vivchar, a member of the Ukrainian national team, has been testing his rubber powered model since September 2012.
- Oleg Grishkov is building his F1C model (folding wing with dimples and sharp trailing edges).
- Russian pilot Leonid Anokhin is building a sailplane.
- A sailplane of the Ukrainian team member Vasily Beschasny flew at the American Cup in February 2013.
- Ukrainian pilots Alexandr Trofimenko, Oleg Pshenichny, and Victor Chigir will start the upcoming flying season with dimpled laminar airflow wings with sharp trailing edges.
- Work is under way to build F1H, F1P, and F1B planes for the Ukrainian junior team lead by coach V. R. Mozyrsky.

Terry Edmonds' EUROPA

The RC Soaring Exchange (RCSE) is an exceptional source of RC soaring information. The above photo came through the RCSE a few days ago with the message "Looking for someone who knows about this sailplane. John"

Well, it didn't take long for Joe Hayes to submit the answer, "I believe it is a Europa designed by Terry Edmonds."

Terry says this about the Europa in his autobiography available on the AMA web site <https://www.modelaircraft.org/files/EdmondsTerry.pdf>:

> "My next design attempt was an F3B model called Europa. The Europa was competitive in smaller F3B contests but never was so in top-level competitions. Nevertheless, it had some nice features so I published a construction article and cover photo in the July 1985 issue of *Model Aviation*."

The Europa is AMA Plan No. 481 US$14, and Terry's Europa construction article is available from the *MA* archives, freely accessible to AMA members.

You can access and join the RCSE, a Google group, by going to <http://groups.google.com/group/rcse>.

The 2013 Mid-South Soaring Event

Pete Carr WW3O, wb3bqo@yahoo.com

An Unlimited ship comes up short on the landing. The view down the field gives some idea of the size and beauty of the Aerodrome.

As you may know, the Mid-South Soaring event moves to different locations each year. This year it was held at the Triple Tree Aerodrome at Woodruff, South Carolina. The site, owned by Mr. Pat Hartness, began as an open field in 2000. Since then it has grown to provide an absolutely wonderful venue for all activities connected with aviation.

The place is not so much a flying site as a sanctuary from the troubles and problems of the outside world. It's normally pretty quiet during a soaring contest, but I was struck by the absence of intrusive noise from outside the Aerodrome. Indeed, the only unusual sound during the three days of the event was the growl of the radial engine of a Stearman biplane as it took off from the far end of the field.

I've been out of competitive flying for several years and decided to go down to see what was new on the winch lines. Also, my son Jeff was the Contest Director so I felt it necessary to go along and get his way.

Some things don't change. For example, the Friday HLG and RES events were treated to a heavy dose of wind. The morning had stronger winds than after lunch and the hand launch people did remarkably well in spite of it.

The afternoon RES event was also tough due to wind and three aircraft were blown into the tree line along the east side of the field. Fortunately, the Aerodrome has a very large bucket truck that is normally able to fetch planes in the trees. However, these ships were far back from the edge of the trees and I have not heard if they were found or retrieved.

Jeff Carr AE1O prepares to fly an Unlimited round with his Tragi sailplane. Jeff was also the Contest Director so was very busy the whole weekend. I timed that flight which was excellent and it was great to share the event with him.

Title page photo: This is looking toward the trees and down to the large lake. I asked about unintended landing s in the lake and was told that it was not very deep but extremely wet!

Left: This RES class Danny flew in Fridays wind and did quite well. The pilot attends to the model while his transmitter is charged from a charger/battery inside the suitcase. That seems to be an easy way to transport the support equipment.

Of course everyone comes for the Unlimited Thermal Duration event and over 40 pilots showed up to take part. The array of molded F3J/Duration models was astounding. Pictures on the various web sites don't do justice to the amazing amount of engineering that goes into these sailplanes.

The radios, most all of which were 2.4 GHz rigs, were fitted into the skinny fuselages and were works of art all by themselves.

When looking at the price tags of these ships a certain amount of sticker-shock is to be expected. However, once you get a good look at the actual pieces and parts you can better understand the price.

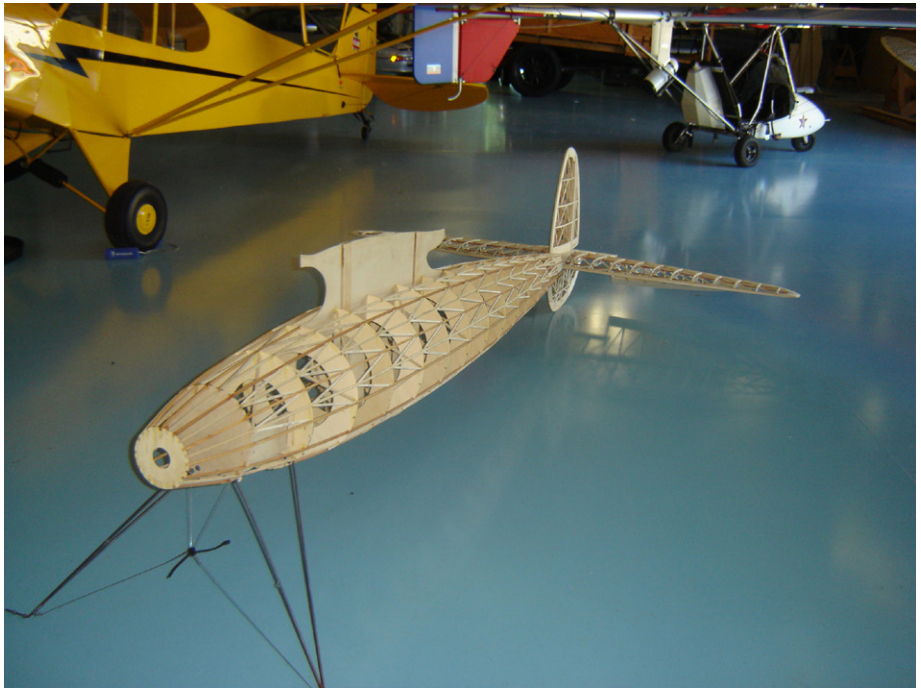
Most all competition pilots practice downwind launches and landings. It a good thing, too, because the wind changed direction each time the winches were relocated. Launches were lower than expected in spite of some truly awesome ping-and-zooms. Landings were as much luck as skill with the challenging conditions.

Opposite page: An Unlimited sailplane dorks the landing. It is using full CROW with the flaps down and both ailerons up to slow the ship down. At left just above the trees is the Stearman biplane flying away after departing the southern end of the field.

Gordy Stahl times for a pilot in the Unlimited event at Mid-South. It was a nice chance for us to sit and chat about our travels. Gordy has some fascinating stories of places like Singapore where he has flown models.

Several pilots bent my ear about the change of dates for the Soaring events of the AMA Nationals. I also had a chat with a member of the LSF governing group regarding the issue of not allowing any radios but 2.4 to fly at the event. I was flying a radio on the 6-meter amateur radio band at the Mid-South and was the only one not on 2.4. Obviously there was no need for frequency pins or coordination and I feel that much the same situation would be evident at the AMA Nats. Hams could easily handle their own frequency conflicts and are used to working together on problems like this. While the issue is not very pressing, I can report that discussions about it were cordial.

As I made clear to everyone, some of us enjoy the electronics of modeling as much as the models themselves. There is a certain satisfaction to building and flying the total package. While they agreed that it's all part of the hobby, the logistics of running the Nats events did not allow the use of frequencies other than 2.4 GHz.



Above left: This is the wing for the Free Flight model. The individual parts of it were also signed by modelers and, as you can see, there are quite a lot of parts. Obviously, this is not a kit and the quality of workmanship was just wonderful.

Above: A partially built model of a pre-WW-2 free flight design was also in the Hanger. On closer inspection I saw that each piece of the fuselage was signed by a modeler. I wasn't able to find out the story behind that.

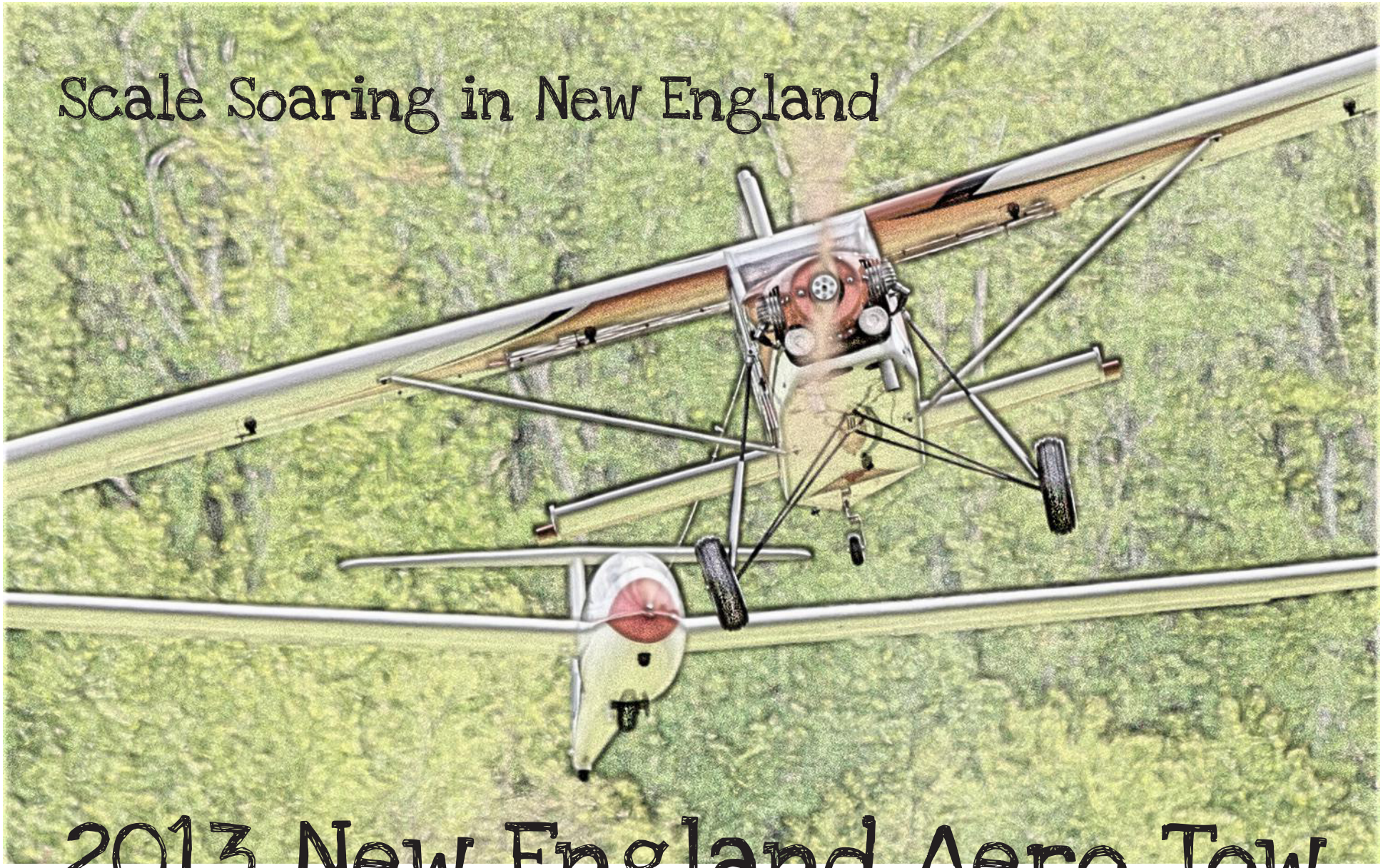
Left: The hanger on the field housed several excellent old aircraft including this AT-6 Texan/Harvard and they are flown regularly.

Gordy Stahl also attended the event so we got to sit and chat between rounds. I got a full outline of Gordy's travels around the world and some of the interesting spots where he has flown sailplanes. I can only imagine the extra stress he must have endured trying to explain the wires and batteries of the model and its transmitter to the security people in foreign airports! He is now retired and enjoying a far less intense travel schedule.

As mentioned before, the sheer beauty of the Aerodrome is hard to believe. For those of us who enjoy the quiet elegance of sailplanes this site is the icing on the cake. Jeff and the landowner had a chat and it was made clear that we are invited to fly there anytime. It's evident that he knows that we share his love of flying. While Jeff ran his legs off for three days to run the event, his efforts were much appreciated by everyone. He also made sure that the site was properly cleaned up following the Sunday rounds so that the staff had very little to do when we left.

If you get the chance to fly at the Aerodrome don't miss it. I've flown the Muncie site at the AMA Nats and that's very good. The Aerodrome is a whole new dimension above that for amenities and a wonderful view. As they say in England, it was a splendid time.

Typical of the Unlimited class entries was this Explorer. The transmitter next to it has two antennas. I was told that the transmitter was converted from 72 MHz to 2.4 GHz and the original antenna was left for use as a wind sock mast. At first glance the arrangement seems odd but works quite well.



2013 New England Aero Tow

Steve Pasierb, steve@rcaerotowing.com

Photos by Jeff Duhaime and R. J. Basque

Aerotow events in the United States are on a growth curve with more new opportunities popping onto the calendar each year. One venerable event is the New England Aero Tow held each spring in the Connecticut town of Salem.

Forty-three sailplane pilots; a dedicated crew of tow pilots, field workers and volunteers manning the food concession; and, a large crowd of spectators numbering over 75 on Saturday made the weekend of May 17-19, 2013 an outright success.

This annual event is organized by one of the oldest AMA model airplane clubs, the RC Propbusters, chartered in 1937. The RC Propbusters' members together with the team behind website RCAeroTowing.com put on a great show.

The flying site features a large, perfectly flat grass runway located in the center of several hundred acres of farmland. While an ideal situation for any RC club, this combination makes for great soaring conditions featuring abundant lift and plenty of space to land out if needed.

The photos that follow do the best job of telling the story. It's one of happy modelers flying a wide range of sailplanes.

What's more, foam construction Multiplex Easy Glider and Cularis sailplanes, setup for towing, were available to first-timers to calm their nerves before the initial flight on their own model. These foam models also proved attractive to several spectators who chose to get a taste of the joy of towing a sailplane to altitude behind a power airplane. More than a few were hooked.

Elsewhere, the pits saw everything from the phenomenal new H-Models 8 meter Arcus, a rare 7 meter Hans Mueller Salto, a pair of mighty 50% Hempel KA6s, and a full range of composite and built-up wood designs.

Importantly, joy was had at every wingspan and price point with many models stick-built and most with spans from two to four meters.

While the huge composite models are certainly impressive on the ground and in the sky, real growth in the scale soaring hobby will come from more modest, attainable airframes that deliver their pilots long, happy flights.

Even with the aforementioned description of this vast flying site, two giant scale sailplanes managed to find the distant trees. The first was lost due to what was

The illusive Schleppmeister has never had his face photographed in public. In all honesty, it's Alex from Lancaster, Pennsylvania, and he drove all the way to Connecticut just to work hard all day towing. Photo by Jeff Duhaime

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Title page: A Topmodel Pilatus Porter spanning 3.2 meters under the control of "The Schleppmeister" hauls another sailplane to altitude. DLE-111 power on stock mufflers. Photo by Jeff Duhaime
The original image can be downloaded from <http://www.rcsoaringdigest.com/images/Aero_tow_Salem-2430.JPG>.

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either electronic or radio programming issues. The second, a spectacular 8-meter Duo Discus, gently came to rest in the highest part of the forest canopy due to nothing more than the deceptive perception of flying such a large model at distance. No one was more surprised than the pilot when that majestic sailplane that was “in front” of the trees suddenly showed itself to be behind the trees! It literally came to a gentle stop with no damage.

Fortune would smile on these two pilots as an expert tree service, owned by a very talented and somewhat amused tree climber, was found.

The first plane was an easy retrieval and went home with its owner needing to do some fiberglass work on the fuselage.

The second, that spendy Duo, posed much more of a challenge. After two hours of strategic tree pruning and skullduggery among the group that ventured into the forest, the Duo was lowered to the ground with rope, dismantled and brought out of the thicket piece by piece.

The tree climber pronounced sailplane retrieval much more fun than cats. He also went home having a nice payday for his time and expertise.

Many who attended will remember the synchronized dual tows of two majestic 50% scale KA6 models.

Rescuing Len Buffinton’s 8 meter Duo Discus from the forest canopy. The professional tree climber pronounced sailplane retrieval much more fun than cats.

The Probusters' flying field is quite wide, so parallel runways permit the continual operation of two tugs. Typically this is where one leaves with a sailplane on tow and shortly thereafter another arrives to hook-up for the next tow. The Two KA6s were spaced at opposite sides of the field and a clear plan was set among all four pilots. With great communication throughout the tow, the KAs were successfully brought to altitude side by side more than once. Everyone thoroughly enjoyed the sight of these two lumbering monsters.

Finally, recognition and sincere thanks need to be given to the tow pilots who flew long hours with wide smiles on their faces. Jim Dolly made the trip from Cumberland, Maryland, and towed each day with his pair of beautiful 3.2 meter span TopModel Pilatus Porters. Jim owns one of the most spectacular soaring sites in the US, the Highpoint Aviation field atop Knobley Mountain at the Maryland-West Virginia border. Another is Alex "The Schleppmeister" who drove from Lancaster, Pennsylvania, to tow all day on Saturday. Alex also flies a TopModel Pilatus Porter. Finally, the local crew towed with a range of planes from a Hempel Decathlon with Desert Aircraft DA170 power for the giant sailplanes down to a simple e-power Telemaster and a 1:4 scale Cub from Hangar 9 on impressive 12S LiPo electric power.

The business end of the 38% Hempel Decathlon tow plane. The huge cowl swallows up a Desert Aircraft DA170 motor with only the sparkplugs extending outward ever so slightly. The Hempel version and new Hangar 9 Decathlon are proving to be popular towing choices. Photo by R. J. Basque

Gunny Bumburs designed and built this impressive 1:4 scale Schweizer SGS 2-33A spanning 153 inches. It is available as a kit from his company Aviation Concepts, distributed by Hangtime Hobbies. Photo by Jeff Duhaime

This beautiful Bowlus BA-100 Baby Albatross was built by the late Joe Radocci of Baltimore many years ago and then safely put into storage. Today, it flies at events thanks to its new owner, Erich Schlitzkus. Photo by Jeff Duhaime

The detail and scale fidelity of the Baby Albatross is apparent in this close-up of the cockpit. The plane flies with no bad habits and thermals like a hand launch glider. Photo by Jeff Duhaime

Axels Scale Pilots are still the best in the business. Here is a custom vintage pilot in 1:3.5 scale properly dressed for his assignment flying the Reiher, yet still employing a modern 5-point harness of his upgraded sailplane. It's 2013 after all. Photo by R. J. Basque

The 50% KA6 from Bill Hempel's Team Edge has become a popular giant scale choice around the world. Spanning 259 inches and weighing anywhere from 45-50 pounds, assembly is actually quite easy with obviously no fussy small parts to handle.
Photo by Jeff Duhaime

Towing was continuous each day. It actually was a bit problematic at times as folks flying needed to step away to the pilot boxes so the next sailplane could move into position for tow. A high-class problem, that is.
Photo by Jeff Duhaime

Electric power has come a long way. This 1:4 scale Hangar 9 Cub flies on 12S 600mAh power and can give five great high tows before a battery swap. That's not the performance of a tank of gas, but with each passing year the technology gets better. Photo by Jeff Duhaime

Don Chamberlain's ASH26 blends exterior schemes with the factory swirl artwork and a strong dose of anti-collision orange. Note the tip wheel for asphalt runways. Photo by Jeff Duhaime

Len Buffinton retrieving his H-Models Duo Discus. This 8-meter span masterpiece came to rest at the top of a tree later in the day, forcing it's two Axel Pilots to spend a long night stranded before being rescued the next morning. *Photo by Jeff Duhaime*

This is the view a scale Axel pilot gets when at his station in the H-Models Duo. Proper detailing of a sailplane inside and out adds greatly to the enjoyment of scale soaring. Photo by Jeff Duhaime

The front office of an H-Models 8 meter Duo Discus in an impressive space. This level of detailing comes right from Radim Horky's workshop in the Czech Republic. This is an stunning sailplane in every phase of flight. Photo by Jeff Duhaime

From Let Models in the Czech Republic, another example of good cockpit detailing right from the factory. In this case, a 6 meter ASH26. A proper pilot figure would complete the illusion. Photo by Jeff Duhaime

Erich Schlitzkus built the pilot for his SG 38 from a short kit, while his grandmother sewed the clothing. The pilot is fully-articulated, moving with the stick and rudder pedals while a servo to turn his head. In total, a spectacular scale model. Photo by Jeff Duhaime

The SG 38 Zogling departs green grass for blue skies. This model is a pleasure to tow. Keeping speeds low results in a very scale ascension to altitude. One can hear cameras clicking every time this plane departs the field. Photo by Jeff Duhaime

The 2013 event was marked a milestone as the largest RC aerotow event in the eastern half of the country. The next New England Aero Tow will be in May 2014, but the RC Propbusters club has aerotowing many weekends throughout the year. And they encourage beginners to participate. If you're in the neighborhood don't hesitate to stop by!

http://www.RCAeroTowing.com

http://www.facebook.com/RCAeroTowing

Erich Schlitzkus did a masterful job detailing his SG 38 and rigging a web of proper flying wires to support the structure. It is not quick to assemble at the field, but the work is richly rewarded. Photo by Jeff Duhaime

A Hempel 38% Super Decathlon powered by a Desert Aircraft DA170 motor has no problem towing this 8 meter span H Models Duo Discus during the 2013 New England Aero Tow. Photo by Jeff Duhaime, Canon EOS 60D, ISO 100, 1/640 sec., f10.0, 126mm