Radio Controlled

Soaring Digest

August 2018 Vol. 35, No. 8

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Back cover: Having used the last of the lift, it's time for the E-Assist Bergfalke to come home. Photo by Chris Williams. Canon EOS 7D, ISO 160, 1/1600 sec., f5.0, 176 mm

R/C Soaring Digest

The journal for RC soaring enthusiasts

August 2018

Volume 35 Number 8

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R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January 1984. It is dedicated to sharing technical and educational information. All material contributed must be original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of each article is the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author.

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Published by B²Streamlines
http://www.b2streamlines.com
P.O. Box 975, Olalla WA 98359

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RC Soaring Digest is published using Adobe InDesign CS6

In the Air

This August 2018 edition of *RC Soaring Digest* is in our opinion one of the more exciting editions we can remember having published. Not only is it twice the size of the previous issue, it explores an RC soaring discipline not previously covered in the annals of *RCSD* — thermal duration soaring with vintage free flight airframes. Our sincere thanks to Martin Pilný ("Vintage RC Event," pages 27-48) and Jerry Krainock ("Homage," pages 49-53) for their submissions which expand the boundaries of RC soaring!

For several years we've been intrigued by Dr. Paul Clark's Myasishchev M-17 Stratosphere and we've finally gathered sufficient information for a meaningful presentation. Thanks go to Paul for providing the archived *Model Builder* and KOKU-FAN materials. The M-17 is featured as a PSS candidate on pages 91-96.

A recent e-mail from Kyle Kroker asking for assistance with a scale aerotow subject, the Jim Maupin Carbon Dragon ultralight sailplane, had us immediately involved in research and we couldn't help but including on pages 97-103 just a fraction of the material we found over several days time. Kyle's goal is to build his model to 1:3 scale and he remains concerned about servo choice. With full span flaperons and a uniquely shaped spoiler, he's finding it difficult to determine the torque required to deflect those surfaces. Kyle's aware of the various "spreadsheet" apps available on the internet for determining servo requirements but is experiencing difficulties inputting appropriate numbers. Any assistance *RCSD* readers can provide will be welcomed.

Our sincere thanks to everyone who submitted materials for this edition! It's been a joy to put together!

Time to build another sailplane!

B²

It is with great sadness that I have to announce that my father - Bruce Abell - has passed away. He lived a long and full life and was 89 on his passing.

Those who knew him will know of his many and varied interests, a passion for aircraft and aviation, a love of native plants, and his fondness for a good yarn.

He will be greatly missed.

A memorial service was held on Tuesday, 3rd July, at 11:30am at St Patricks in Nulkaba, near Cessnock.

Remembering a great man.

- Mark Abell

FAI Record Claims

FAI has received the following Class F (Model Aircraft) World record claims:

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Claim number : 18636
Sub-class : F5 Open / Radio Control Flight
Category : Aeroplane
Group : Electrical Motor Solar Cells
Type of record : Duration: F185
Course/location : Masserac (France)
Performance : 10 h 23 min
Team of France
Date : 10.07.2018
Current record : no record set yet

==

and

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Claim number : 18637
Sub-class : F5 Open / Radio Control Flight
Category : Aeroplane
Group : Electrical Motor Solar Cells
Type of record : Distance in a closed circuit: F190
Course/location : Masserac (France)
Performance : 261,00 km (162.18 miles)
Team of France
Date : 10.07.2018
Current record : no record set yet

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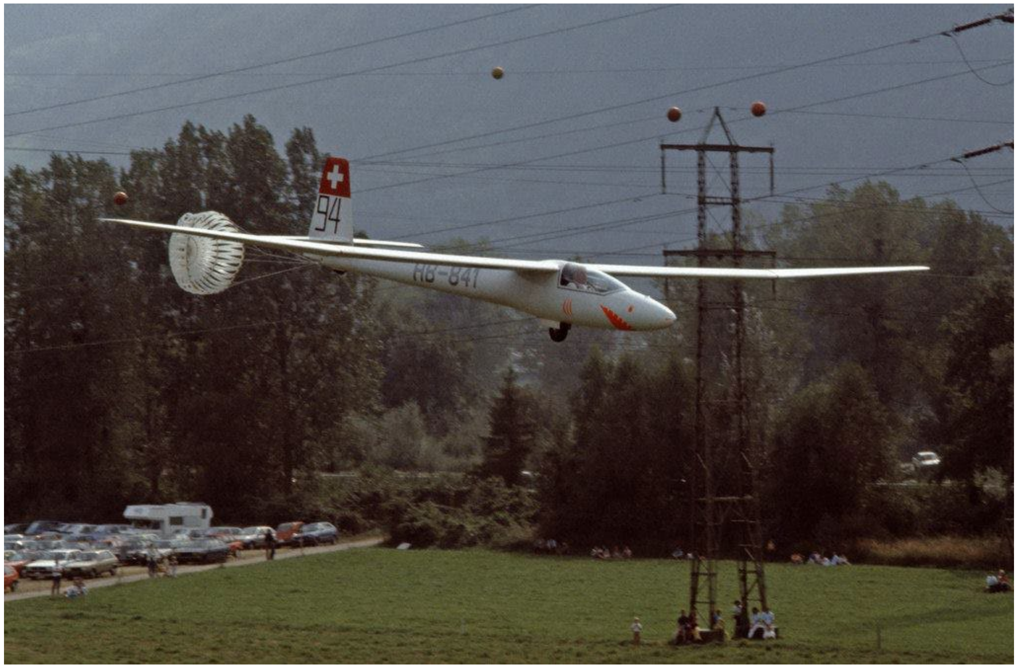
The details shown above are provisional. When all the evidence required has been received and checked, the exact figures will be established and the record ratified (if appropriate).



Sebastien Frossard's Neukom Elfe S3P/HB-841.

50th Anniversary

50 years ago Andrew J. Smith became the last gliding world champion flying a wooden glider, the beautiful Neukom Elfe S3!

- Philip Kolb

From *SOARING*, October 1968, pp. 10-25

"A. J. Smith, architect and now a world champion, assembled a winning formula that re-established the United States in the winner's column, a feat not achieved since Dr. Paul B. McCready's win at St. Yan, France, in 1956.

"A. J. Smith flew his Sisu to 14th place (in the open class) in the '65 Internationals at South Cerney. At Marfa in 1967 Smith was cool, intense, and determined, claiming his second national championship (the first at Wichita, Kansas, 1961, flying an LO-150). At Leszno he seemed to be still climbing the peak - a rather solitary figure, his casual sauntering gait belying his intense, volatile nature.

"Smith built his win on a series of fairly consistent flights. He never claimed a first or 1000-point day (in Poland there was a difference). Henri Stouff's incredible spiral out of first place, with a 44th place finish on the last task, provided the bit of luck that helped A. J. reclaim his lead. But more important, Smith had come through when it counted."

	PILOT	SAILPLANE	COUNTRY	POINTS
1.	Andrew Smith	Elfe S-3	U.S.A.	5595
2.	Per Axel Persson	Libelle	Sweden	5459
3.	Rudolph Lindner	Phoebus A	West Germany	5444
4.	George Moffat, Jr.	Elfe S-3	U.S.A.	5437
5.	Henri Stouffs	Libelle	Belgium	5382
6.	Urs Bloch	Elfe S-3	Switzerland	5369
7.	Giovanni Perotti	Phoebus A	Italy	5259
8.	Edward Makula	Foka 5	Poland	5186
9.	Hans Nietlispach	Phoebus A	Switzerland	5156
10.	Hans W. Grosse	AS-W 15	West Germany	4879

2018 Horizon Hobby Aerotow

Wednesday, June 13, 2018 - Sunday, June 17, 2018

Stéphane Ruelle, steffruelle@gmail.com

Stéphane Ruelle with his Janus coming back from its maiden flight. He seems very satisfied with his winter build. The title page sgh

As every year since I moved to the USA I made this June pilgrimage to Monticello Illinois to be part of the biggest aerotow in the country. The site, the Piatt County Airport, is perfect to host that event with a full-size runaway surrounded by bean and corn fields, no trees, and a full-size hangar for storing the sailplanes and tugs in the evening.

The event has moved through the year from a four day format to a full week of camaraderie, officially starting on Wednesday, most people arrived on Tuesday night and the Wednesday flight line was already quite full with about 30 entries. I arrived on Thursday morning with my trailer and took one of the last spots in the tent alignment. It was my second trip with my enclosed 10x4 trailer, and I have to admit that I should have bought one sooner, so convenient to store model at home and to be sure not to forget anything.

After shaking some hands and being greeted by Ali, Craig and Peter; I quickly put together my trusty 6.5m DG505 to feel the atmosphere. The day was perfect, mild temperature, light wind, small cloud cover. I got in line to take my first tow, two of Peter Goldsmith designed Smelly Yak (Peter and Len), a reproduction of the Smelak powered with a beefy DA150 that I guess does not run more than half throttle with most of the sailplanes.

I enjoyed couple rides in the nice weather, with some mild thermal activity.

After storing my DG I went for a tour to check out the other models present.

Towplane wise, the trusty Hangar 9 1/3 scale Pawnee were present with Ali Machinchi and Rick Shelby - one with a 120cc engine and the other with a 100cc. Several other tugs where present as well: a big Cub coming from Minnesota (Larry), couple of Bidules 170 (Scott and Jim), and there was at least four other tugs in the trailers ready to jump anytime if necessary.

Speaking of trailers, every year I count some more. A lot of attendees are bringing their model shop with them! If you need that tiny metric screw that gets loose in your landing gear, there are at least two people that would have that in their ordinance. The aerotow community is focused on sharing knowledge and assistance, lots of people are bringing spare parts not necessarily for them but just to help a friend that may need it. What a wonderful community!

Thursday saw the peak of the attendance as most people coming in joined Thursday for the weekend. A total of over 55 pilots were present during this event.

Model size varied between a foamy Parkzone Ka-8 to a 40% DG-1000. This is quite a broad range. I have noticed this year some softening of the trend to go to gigantic scale; the perfect

Above: Here’s a happy Swallow builder. You can follow the detailed building thread of the Swallow on Scalesoaring.com <http://forum.scalesoaring.com/forum/aerotowing-slope-scale-soaring/scale-sailplanes/21246-slingsby-t-45-swallow-~-1-3-scale-kit-by-peter-goldsmith-build-thread-by-jimd> / <https://tinyurl.com/y9mrvyvq>.

Right: A 6m Phoenix Model Ka8 coming from Texas.

*Above left: John Ellias
40% SZD Pirat.*

*Above: Ed Derossi came from his home on
the east coast with an LET DG800.*

Left: Robert Morrow finishing assembly of his H Model Arcus, a very popular model for its finish and versatility.

compromise seems to be 1/3 scale as it is just way easier to carry and move around. But some very big models remained in the attendance - a 40% Paritech DG-1000 coming from Connecticut, 50% Hempel Ka6 coming from St Louis, 40% HB Modelbau SZD Pirat coming from California, 40% Rosenthal Ka-6 coming from Minnesota, 40% Airwold Libelle coming from Alabama and I probably forgot a couple. The lion share of the attendance flying with 1/3 scale between Let DG-800, HF Ventus, H Model Arcus, and 1/3 Baudis ASW22 / Antares.

The vintage sailplanes where not underrepresented with a Petrel and an Orlik coming from California, some Ka8 and ASK18, and two pair of Peter G. Design, two 40% Schweitzer 1-26 (Peter and Jim), and two 1/3 scale Slingby Swallow, a model he designed as a present for his wife (Jim and Caroline). Of course the Horizon Hobby model panel were well represented with a bunch of Blanik, ASW-20 and three samples of the newest released 6.4m all composite ASH-31.

This was the second stop of these new model after the Windy Ridge Aerotow, Models will be present at multiple aerotow events in the USA to be tested by those attendance.

I spent a large part of my days flying the ASH-31 and offering attendees a buddy box (I fly Mode 1 in a world of Mode 2 pilots...) to test this new sailplane. I would guess that about 35-40 pilots got their hand on that model for two flights on average. Flying a powered sailplane has some advantage when you want people to try it as the model is ROG capable. According to the feedback I got it should be a hit, I predict event a bigger success here in the USA than the Blanik and ASW-20 previously did.

Above: Burt Pickard Richardson preparing his LET ASH-26 for a flight.

Right: Peter George's Hempel 50% Ka6.


IS-4
SP-15

Peter Goldsmith's Smelak comes in for a landing after a tow.

Some of the towplanes available at the Horizon Hobby Aerotow 2018: two Smelaks from Peter Goldsmith Design and a Hangar 9 Piper Pawnee.

Vladimir Hollis' beautiful 4m Horten IIIb designed by Brian Halkett. Flies like a dream.

On Thursday night after flying until dark, Peter invited everyone to a barbecue and it has been a wonderful way to finish the day, with a great camaraderie. Just seeing Peter's shop is worth the trip.

Operation resumed on Friday with the same clear sky and mild wind. I flew my 7.5m ASW-22 until dark and stayed on the field eating with friends that were barbecuing (Thanks, Scott, for the cooking), and managed to finish my SH Janus with the help of Len. We finished the day admiring the fireflies, and I had to move back to the hotel as the mosquitos seemed to be targeting me rather than my colleagues…

Saturday got a notch up in temperature and humidity, but still manageable, lots of flying and fewer issues. I was able to maiden my Janus that flew like a charm, without a notch of trim, this group project started in 2012 with the donation of a broken fuselage (thanks Steve P.) and ended six years later at the same place where the project started. I had the chance to test couple of aerobatics maneuvers as the model flew as expected and to buddy box all the peoples that helped with the project, that should motivate them to build theirs.

Toward the end of afternoon, the Banquet took place on the field and an amazing raffle with some awesome prices exited the crowd. The Awards were distributed, Peter George for the longest flight, Larry Sorensen for the best tow pilot, Scott Marnoch for the furthest travel (from California through Washington state) and the famous corn award this year with the most row of corn put down by the Nomad of Chris Lash (there was a lot of contestants).

Temperatures rose on Saturday and Sunday making those days a little bit more challenging with increasing humidity in the air. Pilot fatigue cost a couple airframes; two were lost while the pilot flew another sailplane. A little stronger wind caused some short landings in the corn that was growing by the minute with the heat and humidity. No real damage, just a couple of booboos.

As Sunday was Father's Day, most of the crowd left, just the hard core fliers continued to fly in coexistence with the full size glider club that offered some rides to the attendance.

What an amazing week end!!!

The author's Siren C30 Edelweiss taking a pose in front of the Ilini Glider Club hangar.

Above left: One of our Texas friends with his Hangar 9 ASH-31.

Above: Jim Dolly from Maryland, talking about his latest build, a 1/3 scale Swallow from Peter Goldsmith Design, with some Minnesota friends.

Left: Caroline Goldsmith with her husband-designed Swallow.

Opposite page: A view of the assembly.


HB-1965
N500XC

Chris Lash and his 7m Stanley Nomad. Chris came from Maryland with a fantastic dolly to handle moving this large glider. You can follow the Nomad build on RCGroups <https://www.rcgroups.com/forums/showthread.php?1811305-7-meter-Stanley-Nomad-Build> / <https://tinyurl.com/y8rqjwmd>.

Above: John Boyko from Ohio tuning up his Hangar 9 ASW-20.
Right: Asher Carmichael's latest build, a 40% Libelle.


28
D-11-167

Above: Stephane Ruelle 5.33m Janus finished and maidened during this week end.

Above right: Some of our California friends, John Elias (L) and Bill C. (R).jpg

Right: Asher Carmichael enjoying some stick time on Stephane Ruelle's ASH -31.jpg

Opposite page: Jim Frickie's large Reiher.


TF TOP FLITE
ILLINI GLIDER CLUB
2W
F-CGCF

Opposite page: Stephane Ruelle's ASW-22 Two Wiskey in line for a tow.

Above: John Boyko tweaking his Hangar 9 ASW-20. How many hands do you need to fix a sailplane?

Above right: A view of the pilot pits.

Right: Jim Porter's Baudis ASW22, a beautiful GPS racing machine.

The new Hangar 9 full composite 6.4m ASH-31.

Above left: The new Hangar 9 full composite 6.4m ASH-31. This sailplane has been tested during the event by about 40 pilots.

Above: Mike Kelly's pieces of art - a Balestruccio (foreground) and a Vampyr. Mike's from Kentucky.jpg

Left: Tim Mateson, proud new owner of a Rosenthal ASK-13.

Len Buffington's new H Model Quintus.

Vintage RC Event

12-13 May 2018, Litomyšl, Czech Republic

Martin Pilný, pina1971@gmail.com/www.pina.cz

This was a competition of vintage RC planes organized by the local club of supporters of vintage models. There are several categories depending on the type of drive used and the age of the models, from combustion engines, through electric motors to wound rubber.

The rules for each category differ, but in principle, all the competition models must be made according to the original plans and without the use of modern materials.

Flown categories were:
ELOT, ALOT, NMR 2.5, NMR and Elektrorubber.

In every category there is a limited engine run time allowed and you need to land in an outlined space at the airfield at a specified time.

There were 10 participants in this competition. Competition took place at the modelers' airfield near Litomyšl in the Czech Republic.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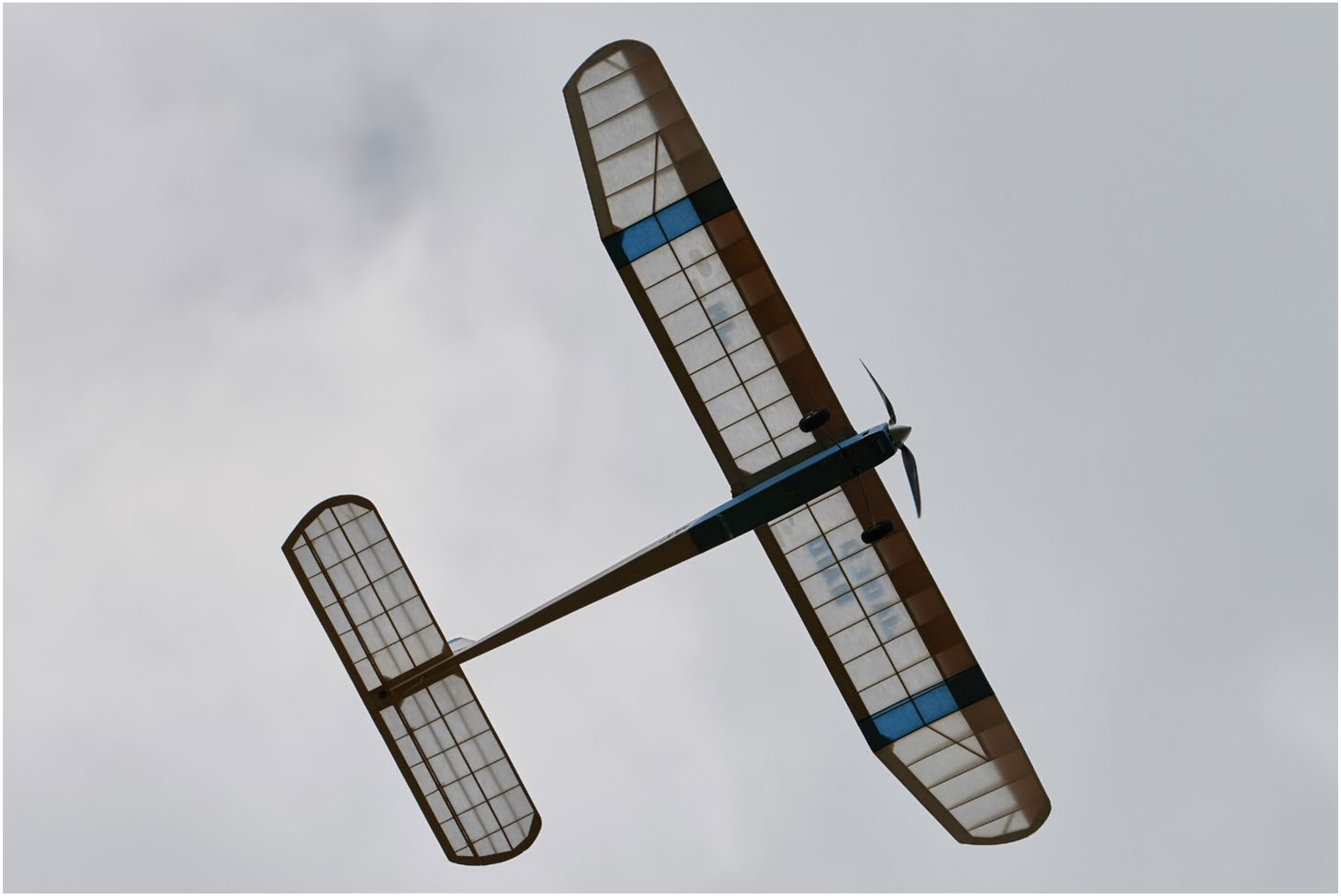
STOMPER

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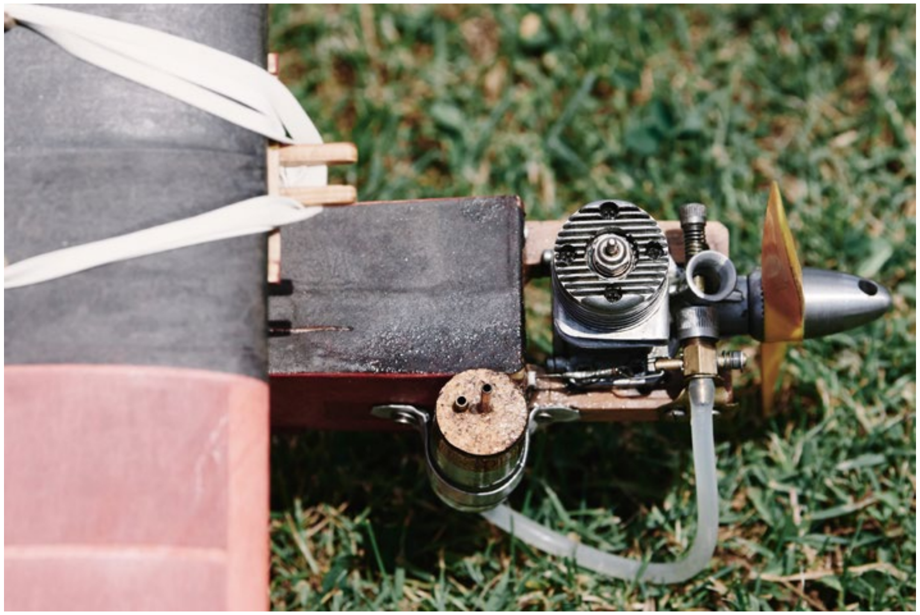
TOP BANANA 1950

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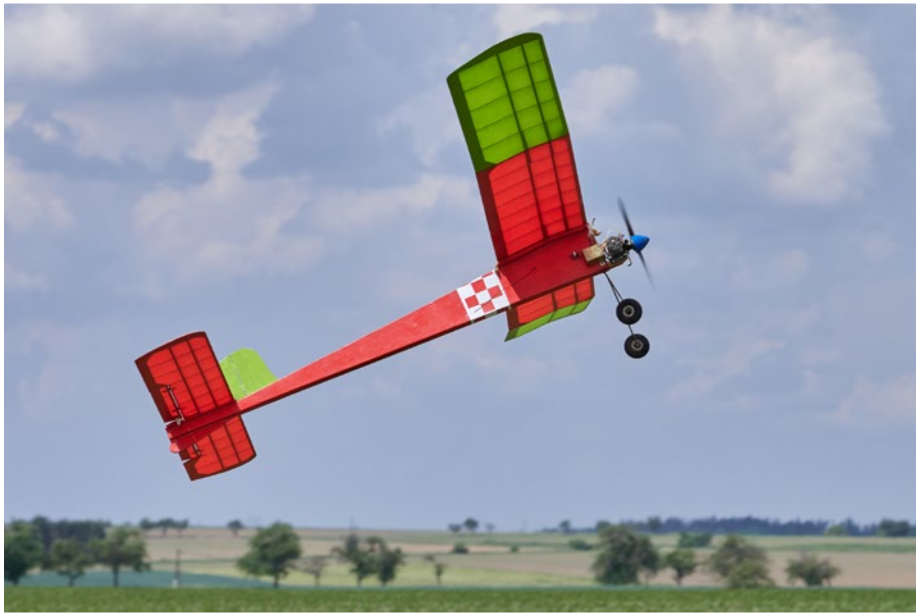
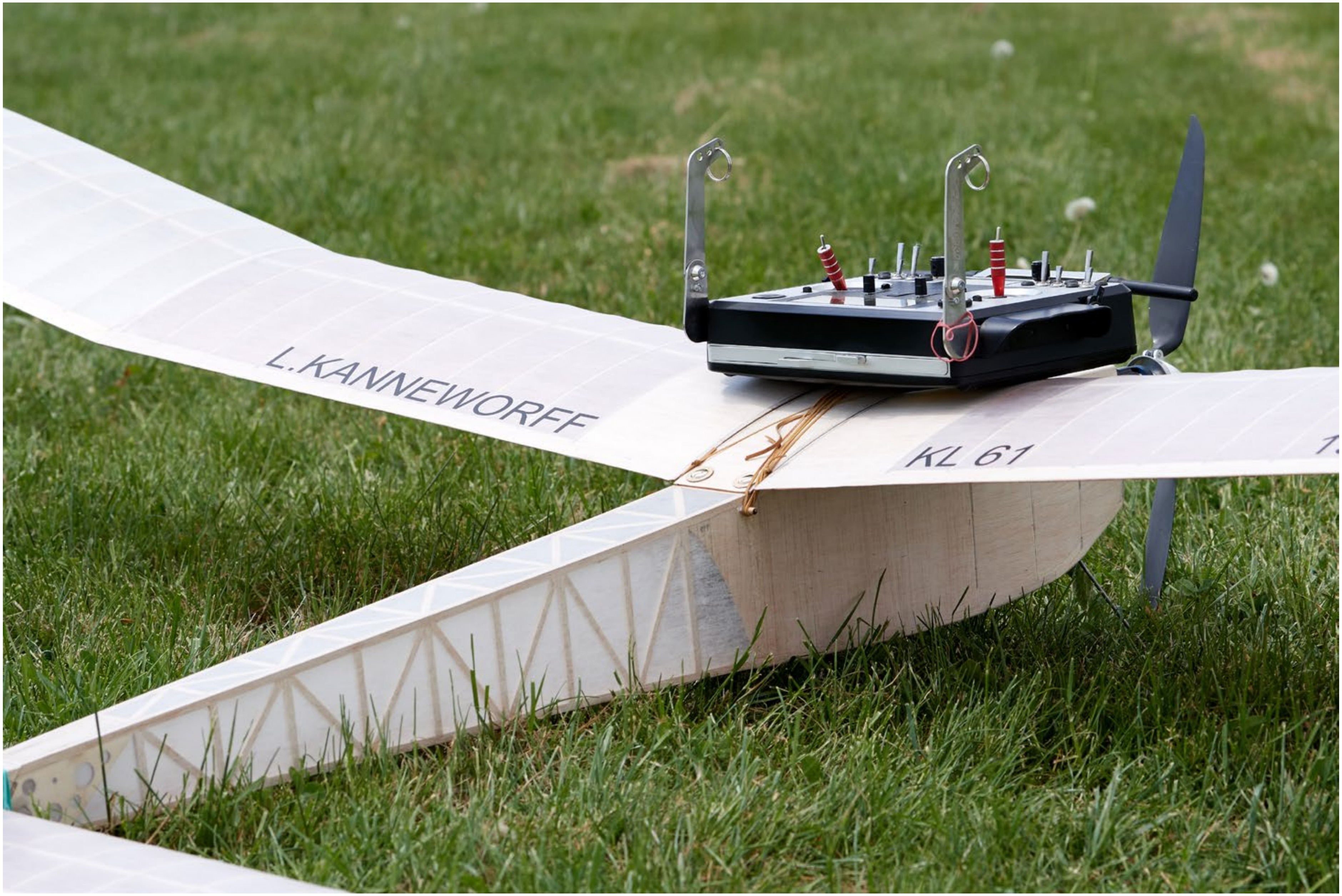



L.KANNEWORFF
KL 61

Homage

A tribute model

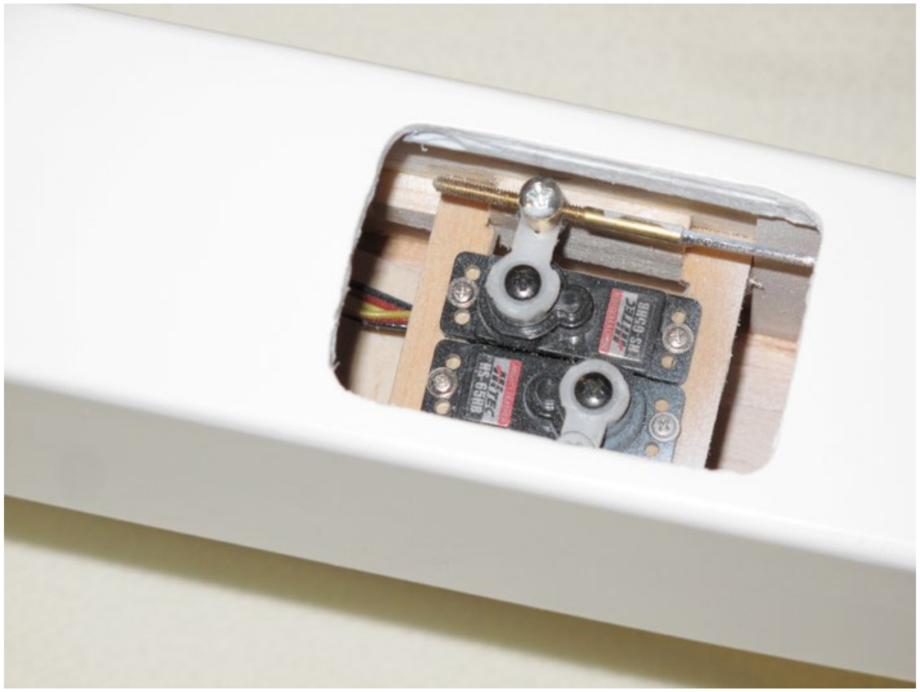
Jerry Krainock, jkrainock6@gmail.com

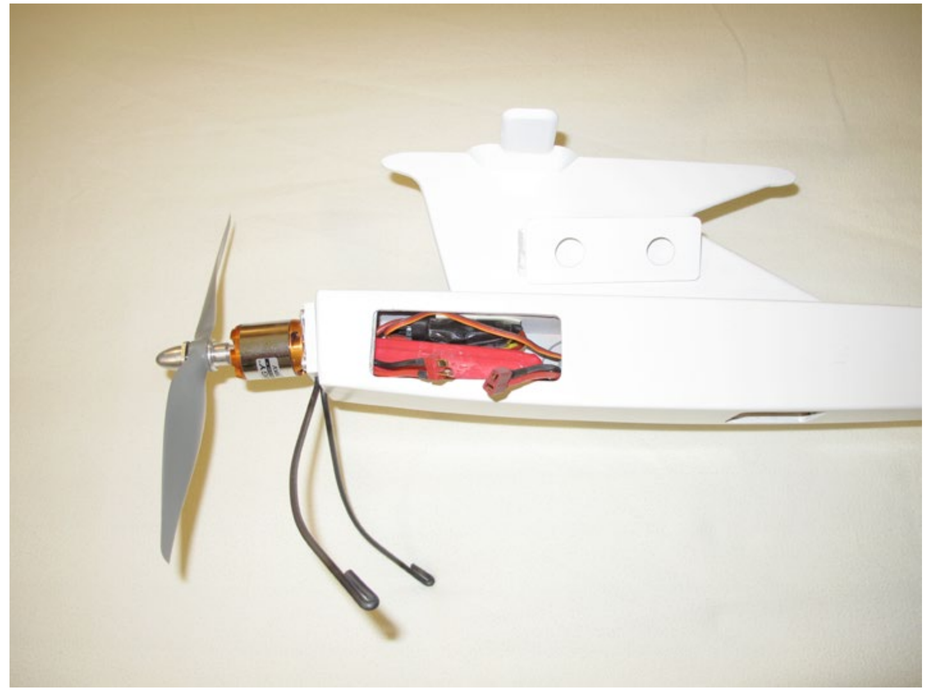
I first got the idea to build a tribute model while taking a CAD class in 2006. I wanted to build a model with some names on it to remember some of the free flight modelers of the late ’50s and ’60s, guys who were active in the LA area and showed up at competitions in the Sepulveda Basin.

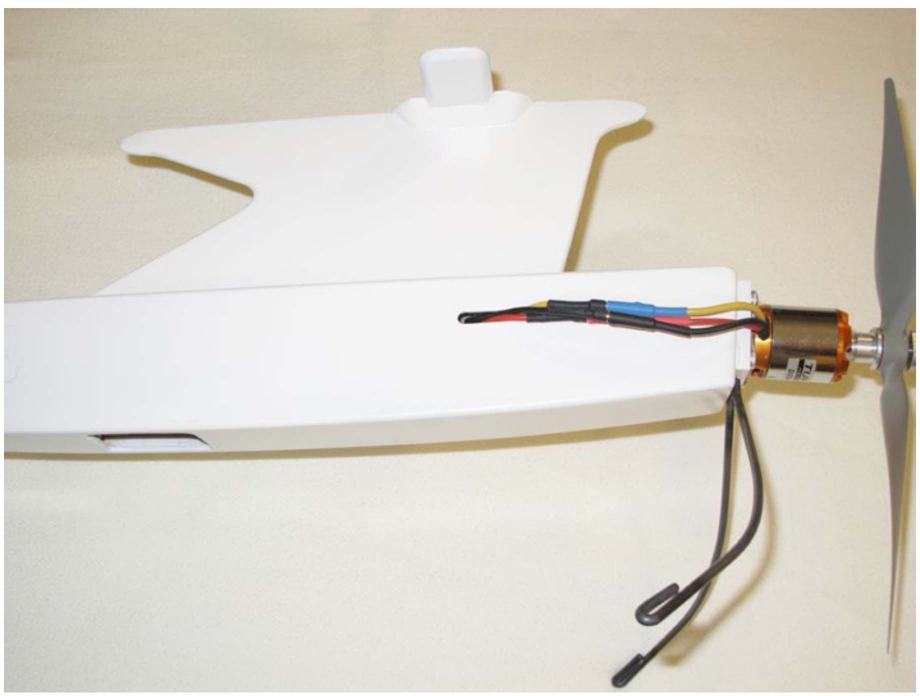
I started the model three times before I finally finished it. I always intended that the model should be electric powered. Initially, I thought a free flight model but, ultimately, it had to be RC.

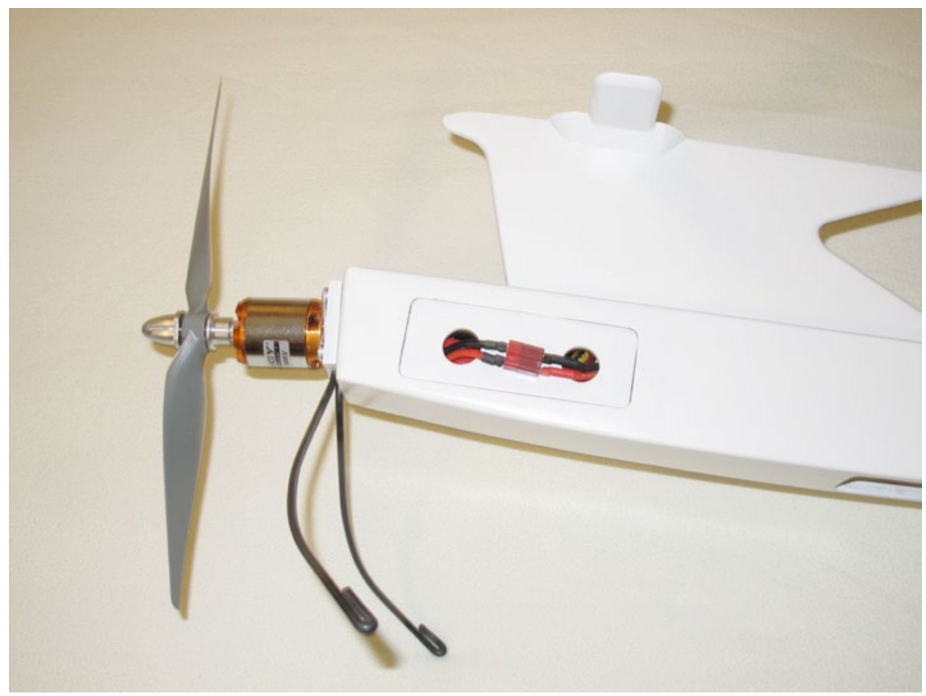
I had laser cut ribs cut for the first two models, and then I lost my shop. I realized the first attempt was so small it would have no impact, so I put it away just as it was ready to cover.

The second model was 85" with 40/60 elliptical tip panels. Carbon capped ribs, spars and a carbon composite TE. A pretty wing. Then I got hung up trying to decide on a pylon or cabin fuselage. I built a flat plate stabilizer and vertical. I stalled out on the building process and in







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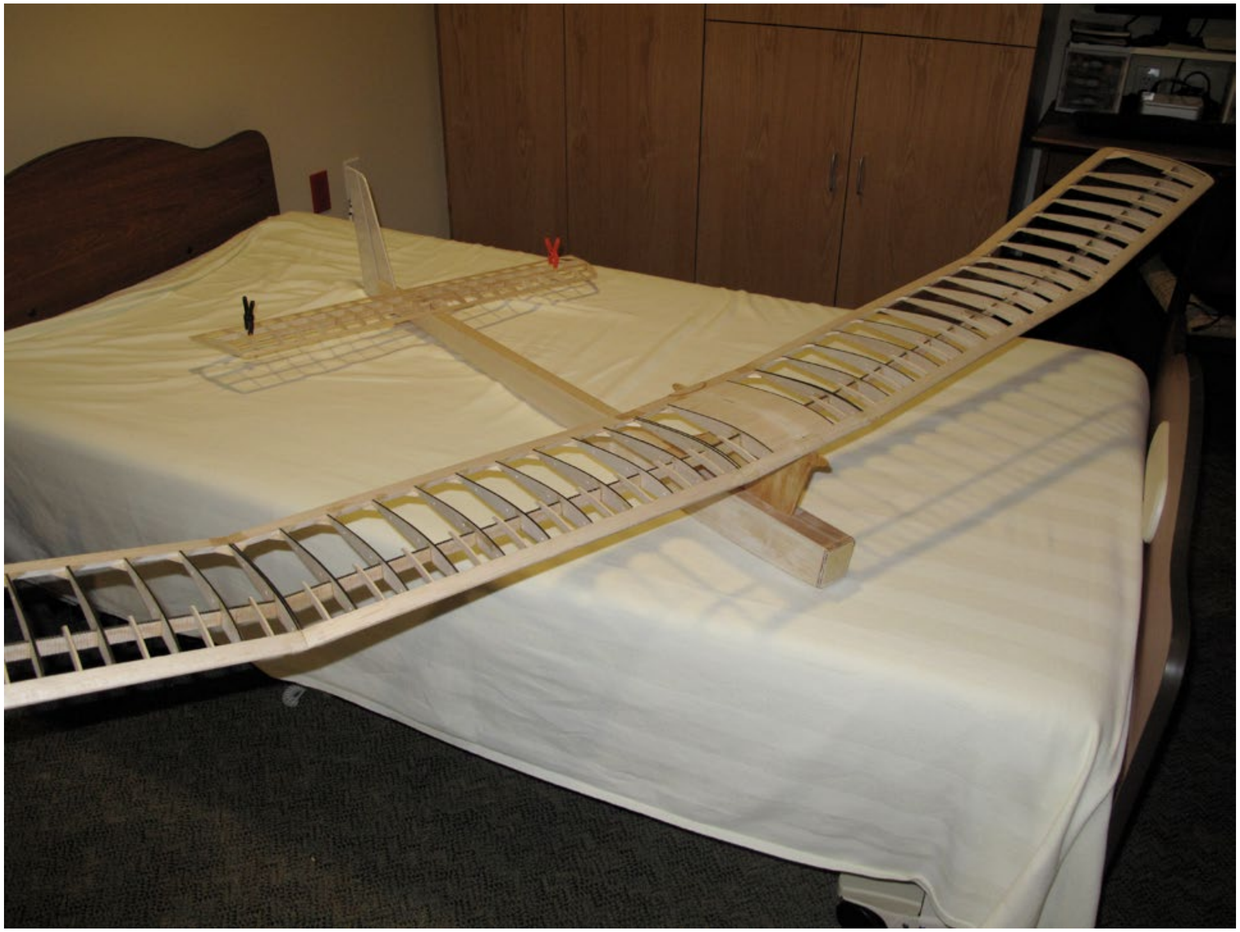


2012 I had to move and I gave away the parts for the two models.

I didn't do any building for a couple of years until I finally got resettled. And then I started thinking about "Homage" again.

This time I settled on an electric motor glider disguised as a free flight model from about 1960-65. I realized that a short nose moment that would be consistent with a power FF would cause CG problems. Then I thought if I built a large, lifting horizontal stabilizer with an elevator, I could have the CG almost anywhere I wanted. I started drawing plans in September 2015.

The wing has stack sanded ribs (CAD license ran out) with carbon caps, and carbon capped spars. The stab and vertical are traditional balsa construction.

I built the fuselage in two pieces, the aft portion is basically like a Star Duster. I needed as much room as possible in the front portion so I could house servos, battery pack, ESC, and the receiver. The front end is basically a box without formers.

My buddy Chris Adams gave me a motor that will make 700 to 740 watts, which is about the same as a Johnson or K&B 29 from that era. In the 50's and 60's we hung the motors on the front of the fuselage and carried the fuel lines and DT/auto-rudder lines on the outside of the fuselage, so I felt justified in running my wiring and push rods on the outside.

I covered the wing and stabilizer around Christmas 2015 and started painting. I had made a list of names I wanted the model to carry and started looking to get some vinyl cut. Finally, OFB Larry Pettyjohn came through after lots of deliberation about fonts and colors and sizes. Thanks, Larry.

Growing up in the San Fernando Valley, I was fortunate to meet some of the greats of the free flight era. I lived about a mile from Hy Johnson's Shop (Johnson Miniature Motors). Bob Hunter used to stop at my house, pick me up and take me to the Sepulveda Basin to fly on Sunday mornings. He trimmed out my first successful power model. In a less than perfect world, Bob was less than perfect, but he brought "Hot Stuff" cyanoacrylate glue to the model world. When he started out, he had shut-ins in the SFVSF (San Fernando Valley Silent Flyers) doing the packaging for him and the invalids made a little money. Bob Hunter was a boon to the hobby and he is sorely missed.

I watched Phil Kraft fly an Upstart at the Cal Western in ’63, an excellent model. My great friend Eddie Slobod told me Lee Renaud flew Wakefield on the East Coast. Lee came to the Silent Flyers Glider Field selling kits from the trunk of his car, the start of what became Airtronics. You had to admire and respect the guy. I built the second Paragon in Slobod’s garage and we did a lot of record runs together. Hal Cover taught me most of what I know about building.

Toshi Matsuda built beautiful models and taught local modelers the Japanese art of tissue decoration. Bob White built exquisite Wakefield models and was finally World Champion. Carl Goldberg retired to the San Fernando valley and joined our club late in his life. You’ve never met a better man. I flew Nordic with Tom (Round Man) Hutchison, and Bill Blanchard. Bill is the best athlete I ever saw throw a Hand Launch Glider. At the ’63 Nats Indoor, Lee Hines and I timed back to back 40 minute flights in D microfilm. So, many of these men I knew personally, and some I knew

by reputation. They are not all in the AMA Hall of Fame, but they should be remembered.

In the end, I had more names than space and some of them, like Martyn Cowley, were more recent friends.

In closing, just a couple of more things; shortly after putting on the last name, I started thinking about how many of the men whose names were shown had passed on. It turns out it is the majority of them. I realized the model is actually a memorial to men and times that have passed. Secondly, I can’t fly it. I cannot take the chance of breaking it.

The model needs a home.

The need for SPEED

Kevin "Rowdy" Botherway, rowdy01@xtra.co.nz

What a great way to spend a weekend!

We were down on numbers with quite a few unavailable for the weekend, but the guys all still carried on heading for our flying location, the Taupo Model flying field. With even a poor weather forecast, the real keen ones laid it on the line.

We have talked about it many times during soaring meetings (beer)... How a few years ago (2004) we ran a speed cup event and everyone always said they were real keen to repeat it. So since we didn't really have enough to man a full F3b distance course we agreed now was the time for another speed cup.

The Taupo Model fliers had approved the use of their field after Hawkes Bay wasn't available due to lambing, etc., so it was a nice central location for a change.

Most of us met on the Friday night knowing we were most likely in for a weekend of waiting for some clear weather. The Saturday morning arrived but was very much lacking in a clear ceiling for us to launch into, so we decided it would clear later and the course was set up hoping for the correct wind direction, and we all prepped ready to fly.

With an early lunch we were finally into it. It was a great team coordination - you were either launching, running the bases, getting winch chutes, or flying fast!

Dave James rebuilt his big Sting V-tail from the last F3b event and got to trim it out again.

Len Drabble borrowed Joe's Maxa Storm and knocked some great times out.

Nice warm flying weather.

Andrew Stiver arrived with another vintage (Faser) and managed to improve all weekend with some great personal best times.

Richard Thomson found a fence post and unfortunately has a little shark bite in his Fosa's leading edge.

Joe Wurts and Richard Thompson call for Len with Rowdy replacing line.

Joe flew his Shinto and got some great times close to the New Zealand record if only for a few long turns. Kev also tried to get his Shinto close to his personal best but it was not to be.

We had five rounds of two speed runs for the day - heaps of flying. We packed up everything Saturday night as the forecast was still not great and back to the accommodation for a nice warm shower and a night of entertainment - rugby, racing and beer.

The next morning was again down on temperature but flyable, so we set up the course. As we set up the local club members arrived and flew for a while off their airstrip. As soon as we started launching our rockets and doing some speed runs they stopped and just sat and watched with interest.

We managed three rounds of two runs each and then the drizzle started to set in for the day. It was time to pack up and depart.

All up there were 16 official speed runs each for the weekend. It was great practice for all of us and Joe offered suggestions of improvement to all of us which was greatly appreciated. I know it all helps.

We input the speed times for Saturday and Sunday, and sorted out an overall weekend score. For the daily and weekend scoring, a discard of the worst flight time, then averaged all remaining speed times. Also evaluated the fastest time for each pilot for bragging rights!

	Joe	Andrew	Kevin	Dave	Len	Richard
Average	16.74	20.87	18.58	22.48	24.57	20.06
Best	14.77	17.90	16.35	18.99	21.94	18.01
Points	1000	802	901	744	681	835
Rank	1	4	2	5	6	3

In 2004 the fastest time was Dave Larsen 16.49. We had 12 entries and achieved 10 rounds.

We had a discussion about organizing a seminar about some key soaring skills – I have finally got an offer from Joe to do this I am sure many will be keen to attend this event. At present we are looking to have an evening seminar at the upcoming SoarChamps, as well as at the New Zealand Nats.

Thanks to everyone who put effort into making the weekend a real success and to the Taupo Model Fliers for their hospitality.

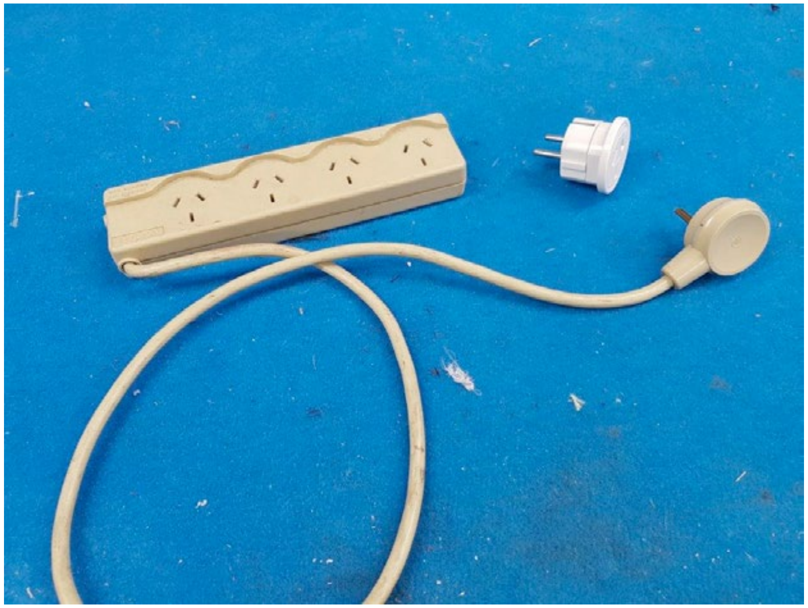
Great to do some F3B flying again!!! Next F3B August 11th and 12th at Matamata.

Soaring Rocks!

Travelling with and charging our radio gear

Kevin "Rowdy" Botherway, rowdy01@xtra.co.nz

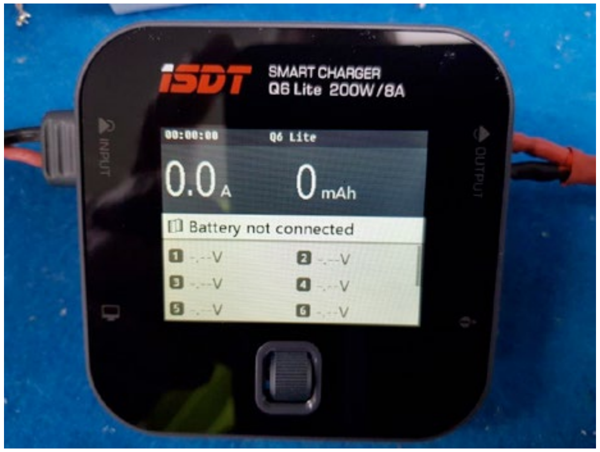
Firstly, when overseas and taking transmitters with you, I usually take two so I also pack a New Zealand type multi-board with my transmitter chargers and a conversion plug. This allows me to plug in two transmitters and also my phone and tablet to charge while in my accommodation in the evening.

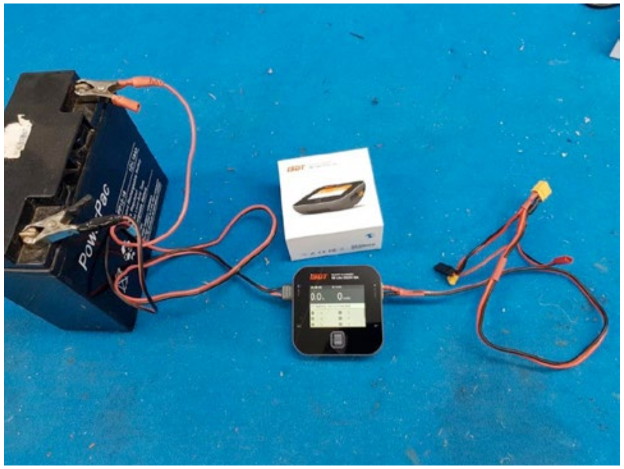


Along with this I have learnt I also pack my transmitters in a hard carry case inside my checked luggage.

I have had one squashed during travel to the 2013 Worlds. If you consider how many bags are on top of each other, most fragile items will be well damaged. I had my joysticks and gimbals smashed.

Secondly, I have two of the ISDT "smart charger" Q6 type chargers which I use all the time. These are very small and light to travel with. They are readily available from David Pratley's Dave's Toys for Big Boys <https://www.davestoysforbigboys.com.au/store/Chargers/Daves_Toys_chargers> in Wantirna, Victoria, Australia.





Q6 charger wired up to a 12 volt supply

Q6 wired up to a Lipo supply

Overall the Q6 is a very compact unit

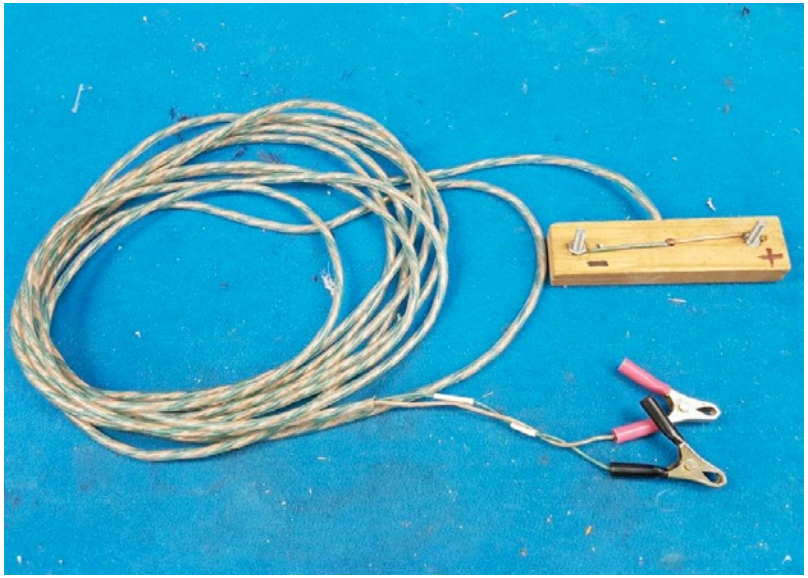
These are awesome and the big plus is they plug straight into a big lipo and you can charge any smaller battery. I use this to charge my RC-HLGs all the time.

Thirdly, the other handy device I have had for years and take all around the world is my 12-volt extension cord.

Usually we hook up to any rental car we have. This saves us having to take the battery out, etc.

We also use for hooking up to a close battery and flogging someone else's power that's around. We have used this many many times.

It's a handy unit to have with you.



ZUNZUN

A PARAMETRIC POD DESIGN FOR RC-DLGS

Joaquin A. Rodriguez Huerta, jrhuerta@gmail.com

I've been working on a parametric pod design. The idea behind it is to be able to change parameters like:

- boom diameter
- chord
- the dihedral angle of the main panel
- nose cone length

and have the pod scale correctly so it can be used with different wing / boom configurations. I am planning to 3-D print two plugs in order to build two molds.

Mold 1:

- 1m DLG 6.5in chord 12 deg dihedral
- carbon fiber arrow shaft as boom 7.3mm diameter

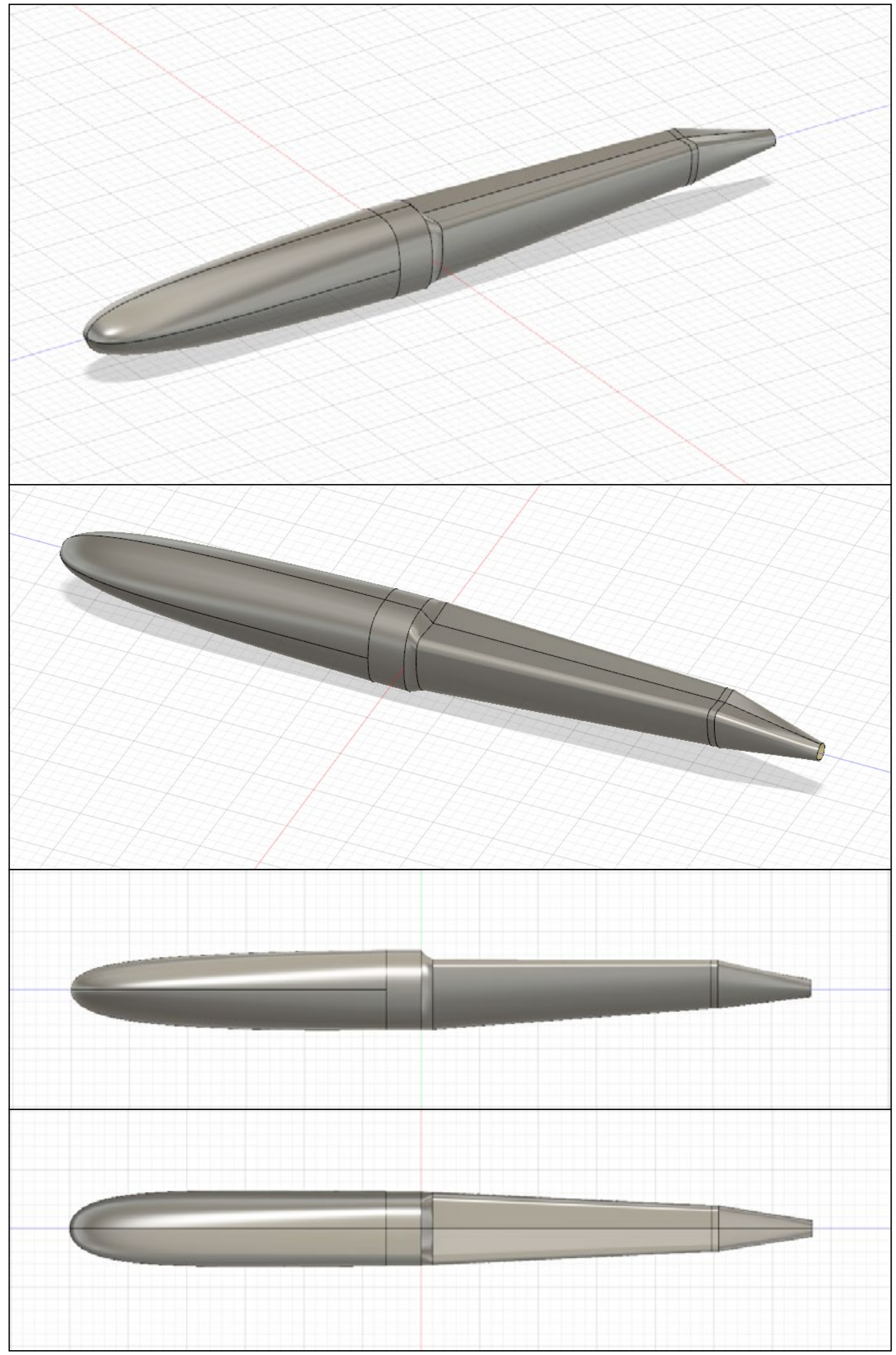
Mold 2:

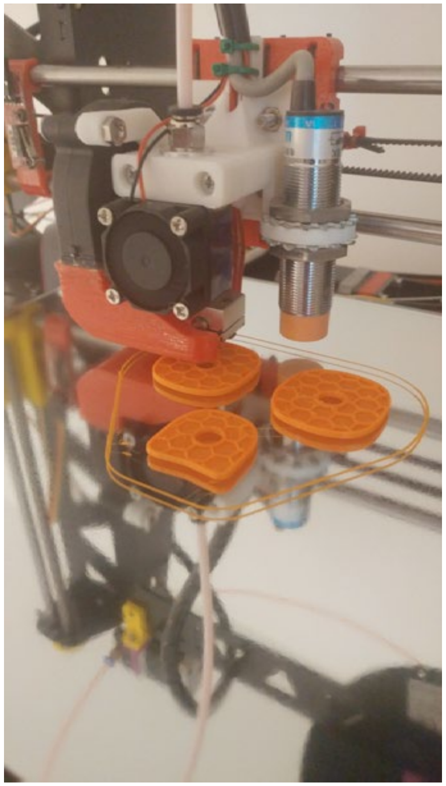
- 1.5m DLG 7.2in chord 6 deg dihedral
- carbon fiber arrow shaft as boom 7.3mm diameter

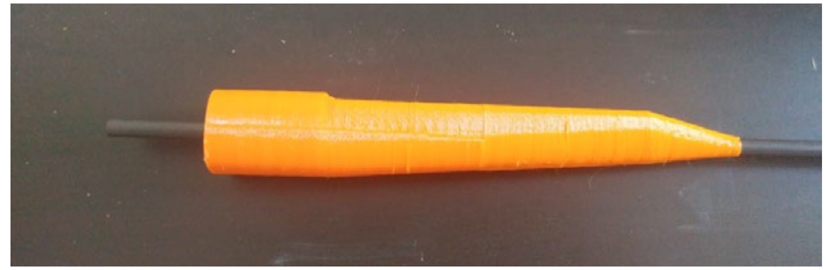
I am attaching a few images of the design. I would be interested in any feedback. Also let me know if this project is of interest to anyone.

I would like to name this pod design ZunZun which is a hummingbird species unique to my home country, Cuba. Just in case you need a name to refer to it.

These are views of the parametric pod.







The following parameters are configurable:
- Nose cone length
- Nose cone bay capacity currently 35mm x 35mm x 140mm
- Root chord
- Main panel dihedral
- Boom diameter

I will keep posting as I progress through the different phases of the mold making. If it all works out I plan to open source the whole thing for the community.

I am a newcomer to the hobby and my main goal with this project is to be able to manufacture a full-size DLG with good quality at a low cost for entry level amateurs like me. I've received a lot of help from the folks at MATS (Montreal Area Thermal Soarers) and it's been a wonderful experience so far. I am hoping to contribute back to the community.

FLUTTER III
CONTROLLING FLUTTER

Chuck Anderson, chucka12@outlook.com

In 1951, the Virginia Tech airport had three J-3 Cubs and one war surplus Interstate Cadet. These were the planes I flew when learning to fly. The Interstate Cadet ailerons had external mass balances to control flutter but the J-3 didn't need them. The J-3 had Frise ailerons (Fig. 1) with balance weight in the leading edge. The 1938 J-3 cub was the airplane that helped introduce Frise ailerons to most light aircraft. Frise ailerons reduce control stick loads as well as provide an internal place for the balance weight.

Aileron is a French word meaning "little wing" and most modern ailerons are built like a wing except that the hinge line replaces the torsion center for structural design. Control surfaces should balance at the hinge line and heavy items should be located ahead of the hinge line to reduce the chance of flutter. Fabric covered control surfaces persisted until after WWII to minimize weight aft of the hinge line and the C-97 flown by the Air National Guard in the 1960s had fabric covered control surfaces. Even Howard Hughes' Spruce Goose had fabric covered control surfaces. I saw the elevators in clear dope just after they had been recovered but not yet in primer when I visited the Evergreen Aviation Museum in 1997.

I learned about the hazards of adding weight to aileron trailing edges when I had to repair a damaged aileron on my pattern model at a 1973 contest. I repaired the damage with five minute epoxy and didn't get excess epoxy off before it cured. The weight of the epoxy at the trailing edge was enough to cause flutter in a split-S turn-around maneuver in the next flight.

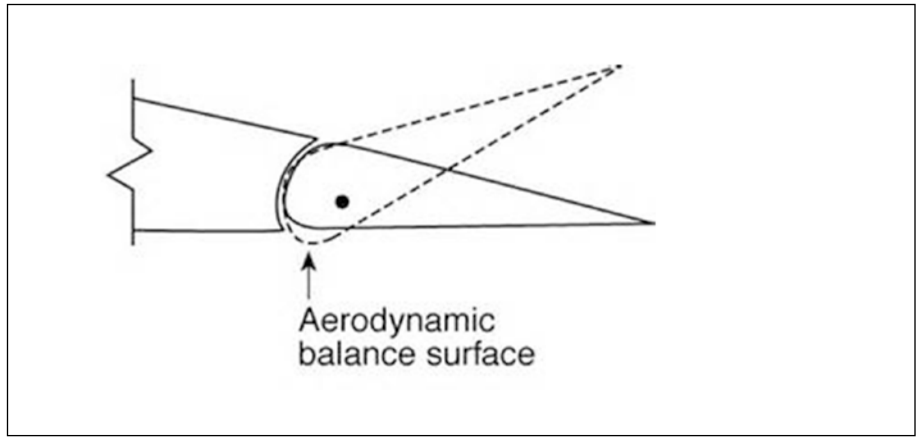


Fig. 1 Frise aileron

Cables, pushrods, and torque rods have all been used to connect cockpit controls to the aerodynamic controls. Pull-pull cables have been used to actuate aircraft control surfaces since the Wright brothers. Some very early airplanes used single acting control surfaces with a cable only pulling the aileron down and the ailerons can be seen hanging down when parked. During the 1930s, a few light aircraft used single acting controls with springs to return the ailerons to their neutral positions when the stick was released.

Single acting cable controlled aerodynamic surfaces are more likely to flutter and are not used on certificated aircraft. The first Ritz Standard A used single acting ailerons but was revised to J-3 type pull-pull cables for the ailerons in the final revision (RCSD-2018-02).

Pull-pull linkage require careful design to avoid cables going slack as controls are deflected lest they become single acting with the associated flutter problems. The manufacturer issues rigging requirements and specify cable tension in maintenance manuals. Light aircraft such as the J-3 set cable tension around 50 pounds using tension meters. Torsional aileron flutter is a flutter caused by the wing twisting under loads imposed on it by movement of the ailerons. Wing flutter is discussed in RCSD-2017-12 and RCSD 2018-02.

As aircraft size and speed increased, force required to move the controls increased and various schemes were developed to reduce physical demands on the pilot. Control wheels replaced control sticks and servo tabs were used on many large aircraft to reduce control loads before hydraulic boosters became common. The jet age brought major changes to aircraft control systems. The F-86D I flew in 1956 had full hydraulic actuators with artificial feel for ailerons and stabilators and had no mechanical connection to the control stick. Only the rudder had manual controls without hydraulic boost.

The modern trend is to actuate the control surfaces of high speed aircraft with fly-by-wire controlled actuators without a mechanical connection between the cockpit and the control surface. Fly-by wire control systems have improved until many fighter and some transport airplanes now use side stick controllers.

About 30 years ago I was asked to find a way to add remote controlled fins to a wind tunnel missile model to speed up testing by eliminating the need to shut down the tunnel to manually change fin deflection angles. The large internal balance and sting required to withstand the aerodynamic loads at supersonic Mach numbers did not leave enough room in the afterbody for fin servos. I suggested installing servos ahead of the balance and driving the fins with pull-pull cables routed around the balance through slots in the model body. I had a team with design, stress analysis, and instrument engineers to do the actual design.

Pulleys mounted on the missile body at the fin and ahead of the balance allowed the use of the very high cable tension needed at high Mach numbers without excessive load on the servo. The endless loop control cable was pinned to the fin pulley and eliminated the possibility of the cable going slack. (Fig. 2) Most model servo bearings are not designed to withstand the loads imposed by pull-pull cables so this would be a good way to use pull-pull cables in large and high speed models.

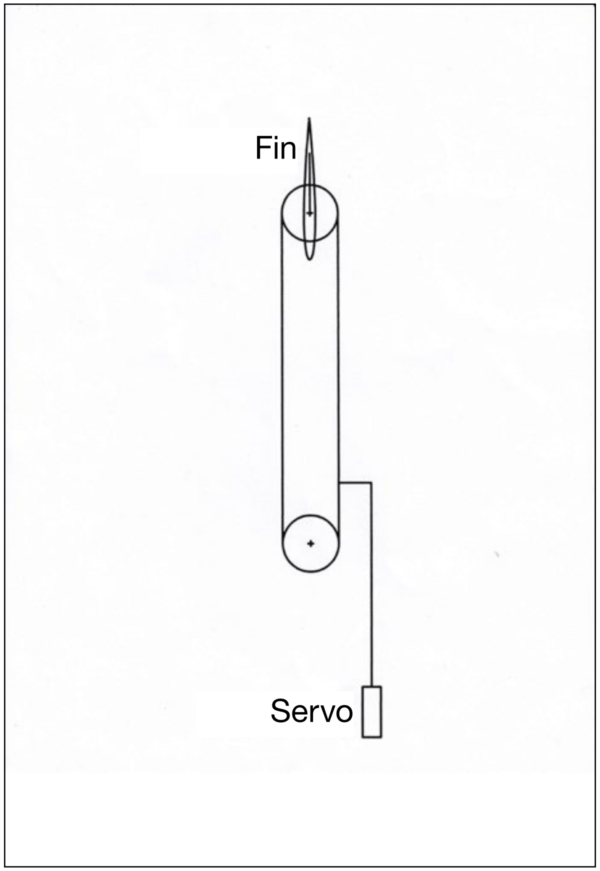


Fig. 2 Missile pull-pull control linkage

Model control systems are still in the pre-WWII era although some dynamic soaring models are pushing transonic speeds where shock waves on control surfaces start affecting control. Most of us are still in the J-3 era as far as our radio control models are concerned and have the same flutter design challenges as light aircraft. Our servos are connected to controls by cables, pushrods, or torque rods and I have used all of them.

Early RC models mounted batteries, escapements, heavy servos, and actuators in the nose where the weight was needed to balance the models and were connected to the control surfaces with strings, pushrods, and torque rods.

My first 1956 RC model used a torque rod to connect a Southwest magnetic actuator to the rudder. The actuator and torque rod were replaced with a Flyball actuator connected to the rudder with a string to give proportional control without a flapping rudder. The Flyball actuator (Fig. 3) was a single action control that pulled the rudder in one direction and a rubber band pulled the rudder in the other direction. Maximum power of the Flyball system was limited to the strength of the rubber band but most of the actuators of the era were also low power devices.

The Flyball actuator was only one of a multitude of servos, magnetic actuators, and escapements used to control models in the early days.

In the days of rudder-only RC systems, single action system such as the Flyball had an additional handicap in that spiral dives normally used to gain speed for aerobatics may gain enough speed to override the rubber band for opposite rudder, delaying recovery from the spiral dive. I soon went back to the magnetic actuators that had equal power in either direction.

In 1964, I still used a torque rod to connect an escapement to the rudder of my Tern (RCM May 1967) power pod sailplane. (Fig. 4) The Tern was basically a free flight model that could be steered to a thermal, left to free flight in the thermal, and landed back at the launch site. Batteries for magnetic actuators would have been too heavy and I had to live with the limited numbers of control movements available from the rubber band driving the escapement.

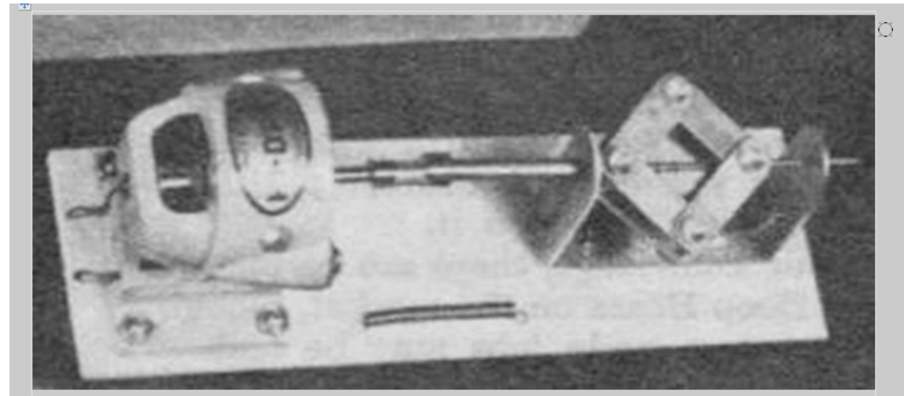


Fig. 3 Polk's motorized centrifugal Flyball actuator

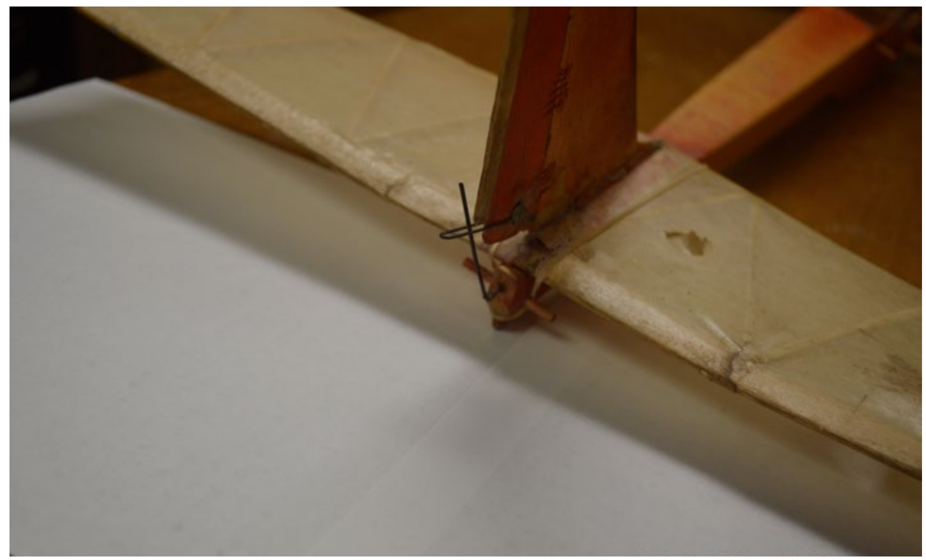


Fig. 4 The Tern rudder linkage

These were the popular controls used in the early RC models that were basically free flight models that accomplished little more than the ability to land back at the launch site. Flutter was not normally a problem with these slow models and slop in the linkage didn't become a problem until we began flying larger and faster models. Escapements and magnetic actuators did not have a lot of torque and could not overcome a tight linkage.

By 1953, a few people were adventuring into more advanced high speed models and I watched Jim Walker demonstrate a Fox 59 powered large semi-scale Piper Super Cub with rudder, elevator and throttle control. He demonstrated various aerobatic maneuvers ending with an outside loop. His model was fast enough to encounter control flutter and he did suffer elevator failure in his final flight that day. RC models had progressed to the point where flutter was beginning to be a problem to be considered when designing aerodynamic controls.

As RC models started using larger engines, manufacturers began producing stronger servos allowing tighter linkages and modelers began using components from typewriter links to reduce slop in control links.

Torque rods remained a popular method of connecting escapements and actuators to rudders and elevators at low speeds but had flutter problems at high speeds because of the slop in most early systems. Fig. 4 shows the link between the torque rod and the Tern rudder.

Early radios often had problems when the servos used long leads to connect to the receiver and frequently required condensers, chokes, and servo amps in the servo leads.

In 1968 I flew Class 2 pattern contests with a highly modified Goldberg Falcon 56. Class 2 was limited to rudder, elevator, and throttle. AMA 1969 rules changes deleted the old Class 1, 2 and 3 and allowed ailerons in the new Class B so I added ailerons to the Falcon 56 for an interim Class B model until I could build a new model. The very large Orbit servos of the 1967 Micro-Avionics radio I was using made it difficult to add another servo for conventional ailerons without a major rebuild.

On the advice of a local expert, I mounted a servo upside down under the canopy with the servo arm extending down into the wing to drive an endless cable around pulleys in the wing. Pushrods connected the ailerons to the pulleys (Figs. 5). The pulleys were connected with an endless loop cable through the Orbit servo arm on one side while the other side had a spring to set tension. Fig. 6 shows the Orbit servo arm and the spring in the cable. The spring set the cable tension and prevented the cable from going slack.

Fig. 5 Aileron pulley

Fig. 6 Servo arm and spring

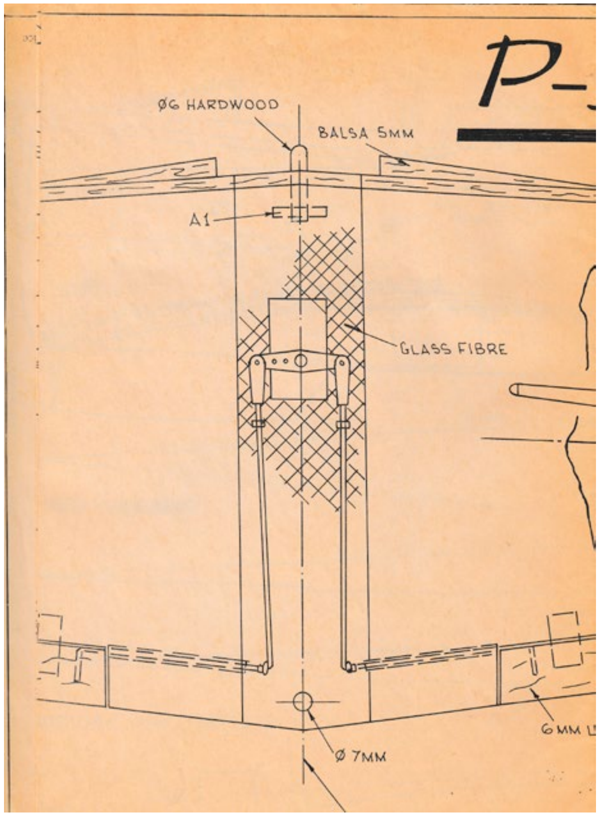


Fig. 7 Typical single servo aileron linkage

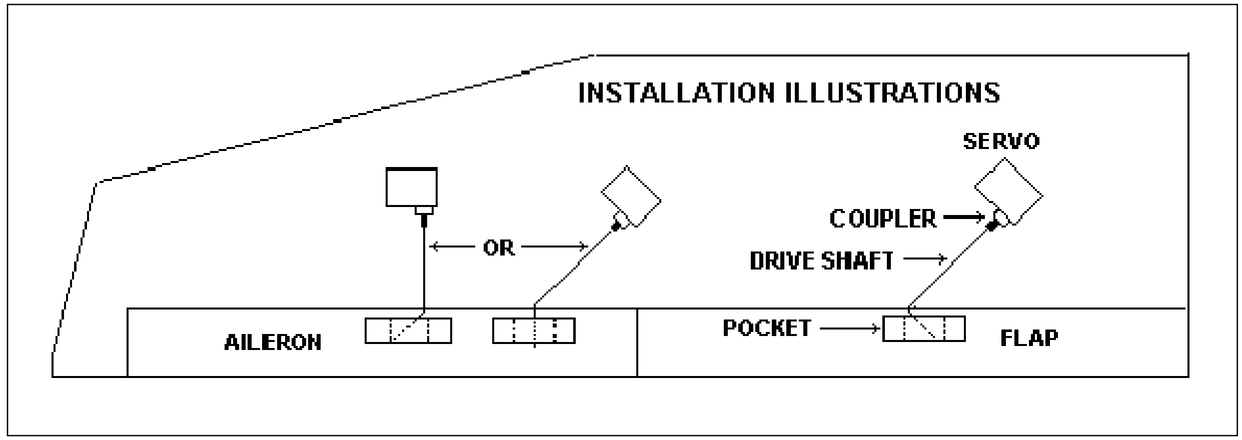


Fig. 8 Harley Michaelis' torque drive

I used most of the standard aileron control systems over the next 50 years and never found a tighter, more slop free system than the pull-pull ailerons of the Falcon 56. This pull-pull linkage did not load the servo electrically or mechanically.

Twenty years later I used a similar pull-pull linkage to connect a remote servo to the fins on a supersonic wind tunnel model. The low speed of the Falcon 56 did not require a very strong spring while the supersonic wind tunnel model eliminated the spring and the cable tension was set to several hundred pounds.

Torque rods were frequently used to connect ailerons to a single wing servo mounted on the wing centerline as shown in Fig. 7. This was usually replaced by servos in the wing when small servos became available. This was the aileron setup I was using in my pattern model when I had the flutter problem.

Modern radios usually need nothing more than a condenser between the signal and negative servo wires for very long servo leads in large models. The extremely small receivers now available allow giant scale models to have separate receivers mounted near remote servos and only need power leads from the receiver to the battery.

Harley Michaelis' rotary driver system solved many of the problems of earlier torque drives and made it possible to install flap and aileron servos in wings without external pushrods, horns, or clevises. See Harley Michaelis' RADS Design on the Charles River Radio Controllers web site <http://www.charlesriverrc.org/articles/construction/harleymichaelisrads.htm> / <https://tinyurl.com/y9gqp2en>. Fig. 8 from the Charles River reference illustrates Harley Michaelis' torque drive.

Single acting linkages are still viable control systems for low speed applications such as indoor models and are also used for some sailplanes but have flutter problems at higher speeds.

Maximum torque of a single action linkage is set by the spring and the servo is constantly under the spring load. Single action systems require careful design to avoid servo failure and handle the increased battery drain. Vladimir's Model Plus F5J sailplane is a good example of using single acting cables and torque springs to drive elevators and solve some unique problems. (RCSD 2018-06).

I have used pull strings for wheel brakes on power models and still use them for sailplane spoilers. RCSD-2016-05 shows how I used pull strings to actuate spoilers with a servo in the forward fuselage where the weight is needed instead of outboard in the wing aft of the wing torsion center where the weight adds a flutter hazard and increases roll inertia.

Control surface flutter involves all components of the control system from the servo to the control surface including all connecting links. One of the most common causes of flutter is slop in the linkage between the servo and the control surface. Loose linkages are also often the result of wear from flutter.

Pushrod connections to servos and control horns should be as tight as possible so avoid oversize holes in servo arms and control horns. The popular z-bend requires an oversize hole to be inserted in the control horn or servo arm and should be avoided if possible. A clevis or simple right angle bend with a keeper is a much better way to reduce control slop.

Checking for slop in control linkages before flying is good insurance. It doesn't take that long to wiggle control surfaces by hand to see how much slop there is and determine its origin. Servo gears, servo arms, clevises, and control horns all get worn. The low-pitch buzz of control surface flutter is often difficult to detect from the ground so the lack of buzz does not necessarily mean there is no flutter. I once heard a Nats sailplane flyer remark that the stabs fluttering down after coming off in a zoom could not have fluttered because there was no buzz. I wondered what he thought caused the stabs to come off

Careful design of the control linkage can reduce the effects of wear in servo arms and control horns by using longest horns and servo arms that can be installed in the model. Pushrod holes in plastic control horns can be bushed with brass tubes to reduce slop and wear. (RCSD 2016-04) Slop from servo wear can only be reduced by replacing the servo or servo gears.

Solid pushrods should be stiff without binding or rubbing on model structures. Flexible pushrod sleeves should be supported at frequent intervals to prevent movement when controls are activated under load. Pull-pull control cable linkages should be designed to assure that no cable goes slack at any control deflection. Single action cables should be used only for low speed models or non-aerodynamic applications such as brakes or spoilers with careful design for the constant load of the spring on the servo and battery.

Control surface structures should be designed to minimize weight aft of the hinge, however many models hinge rudders, elevators, ailerons, and flaps at the leading edge. For these, taper thickness aft of the hinge and avoid heavy finishes.

Rudders, large elevators and stabilators (all moving stabilizers) are more suited to built-up structures with heat shrink covering. (Shades of the Gooney Bird's fabric covered controls).

The covering material is a critical component of built-up structural stiffness so it is essential that the covering be kept tight and attached to all ribs and edges. Monokote is the strongest of the available heat shrink coverings and I still prefer it for stabilators.

Most modern model sailplanes use all moving stabs whether X-tail, T-tail, or mounted ahead of the fin and I have used all. I have also used V-tails but linkage problems restrict them to fixed stabs with separate elevators.

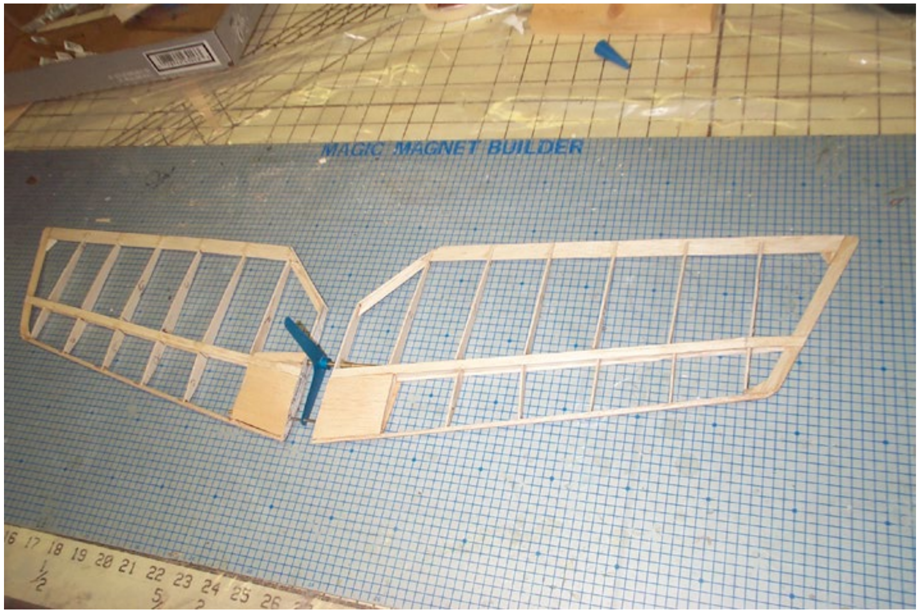


Fig. 9 LilAn stab

Stabilators should be designed with the pivot at or slightly ahead of 25% MAC and balanced at the pivot. All my sailplane stabilators since 1974 have been designed by procedures in "Stabilator Design" published in the July 1977 issue of *Sailplane*.

Essential points from the article were (1) place the pivot at or slightly ahead of 25% of the mean aerodynamic chord (MAC), (2) balance the stab and horn about the pivot, (3) minimize weight aft of the pivot, and (4) rigidly connect left and right stabs.

The stab of my most recent model (RCSD-2017-04) had the pivot at 25% of the mean aerodynamic chord. Reversing the bell crank placed the heavy components ahead of the stab pivot while the slight sweep of the stab allowed wider separation of the stab wires to minimize the effects of wear in the stab horn as well as moving the forward wire and wheel collar further ahead of the pivot.

The LilAn stab uses a 1/8 inch birch dowel leading edge and a brass wheel collar on the forward stab wire to clamp the left and right stabs together. Aerodynamic loads are carried by a balsa I-beam spar at 30% chord and the trailing edge is 1/16 inch thick by 1/2 inch wide balsa. It can be driven to flutter in an aggressive zoom but has not required adding weight to the leading edge to balance at the pivot in normal service.

Fig 9 shows the stab of my last model before covering (RCSD-2016-04). I have used this design for my stabs for the last 20 years. It has been crash tested and post crash analysis found it to be strong enough for normal air loads. (RCSD- 2014-07).

So much for theory, history, and war stories. What can the average modeler do to minimize control flutter?

Some of the things are:

1. Do everything possible to minimize weight aft of the hinge.

2. Be sure that pull-pull cables do not go slack at any control deflection angle.

3. Balance control surfaces about the hinge.

4. Use rigid pushrods and anchor flexible pushrod housing to model structure.

5. Design linkages to use longest servo arms and control horns compatible with the available model space.

6. Frequently inspect model control surfaces for control slop and replace any servos, controls horns, and servo arms that have excessive wear.

7. Avoid Z-bends and other sloppy pushrod connections.

Rich Henderson's Mitsubishi A-6 Zero, 67" span PSS from Tony Nijhuis plans, 9lb AUW, 32oz/sq ft loading, awesome performance. Photo taken at the 2017 PSSA "Fly for Fun" event sponsored by the Lleyn Model Aero Club, Lleyn Peninsula, North Wales, by Phil Cooke, webmaster@pssaonline.co.uk. Canon EOS 7D, ISO 160, 1/1250 sec., f5.6, 190 mm

John Copeland's 8 meter Stemme 10

John Copeland, Waikerie South Australia, built this large scale Stemme 10 several years ago and has at various times posted photos of his creation to his FaceBook page <https://www.facebook.com/john.copeland.1232>.

We're sure you'll agree the most fascinating part of the machine is the retractable propeller mechanism John created in his workshop.

We believe the Stemme 10 is now owned by someone in the United States.


Warning Propeller


Warning


Warning
Propeller

LANDING ON!

(NOT LANDING OUT)

Chris Williams, c_williams30@sky.com

It will not have escaped the notice of those who sometimes pay attention to the outside world, that we live in changing times. One of the things that I have noticed in recent years is the changing of once reliable weather patterns. Now unlike most of their powered counterparts, scale sailplanes have the luxury of being operated at two completely different venues: either from the slope, or from the flat via aerotow. The latter has not really been too affected by the changing weather, but in my part of the world (the county of Dorset in Southern England) the once slope-friendly winds have become surly and uncooperative, vindictively blowing in all the directions that are of no use to us at all…

There is a reason that many of us, if forced to declare a preference between aerotow and slope flying, would prefer to fly our scale models from the slope (hoping all the while that no tug pilots were listening). The reason is this: operating from the hill allows for repeated close-proximity flying, thus enabling the pilot to appreciate and enjoy the fruits of his or her labour, and as a side benefit, listen to the satisfying sounds of an airframe politely asking the air to move aside. (What about the beautiful scenery, I hear you ask? Yes, that too.)

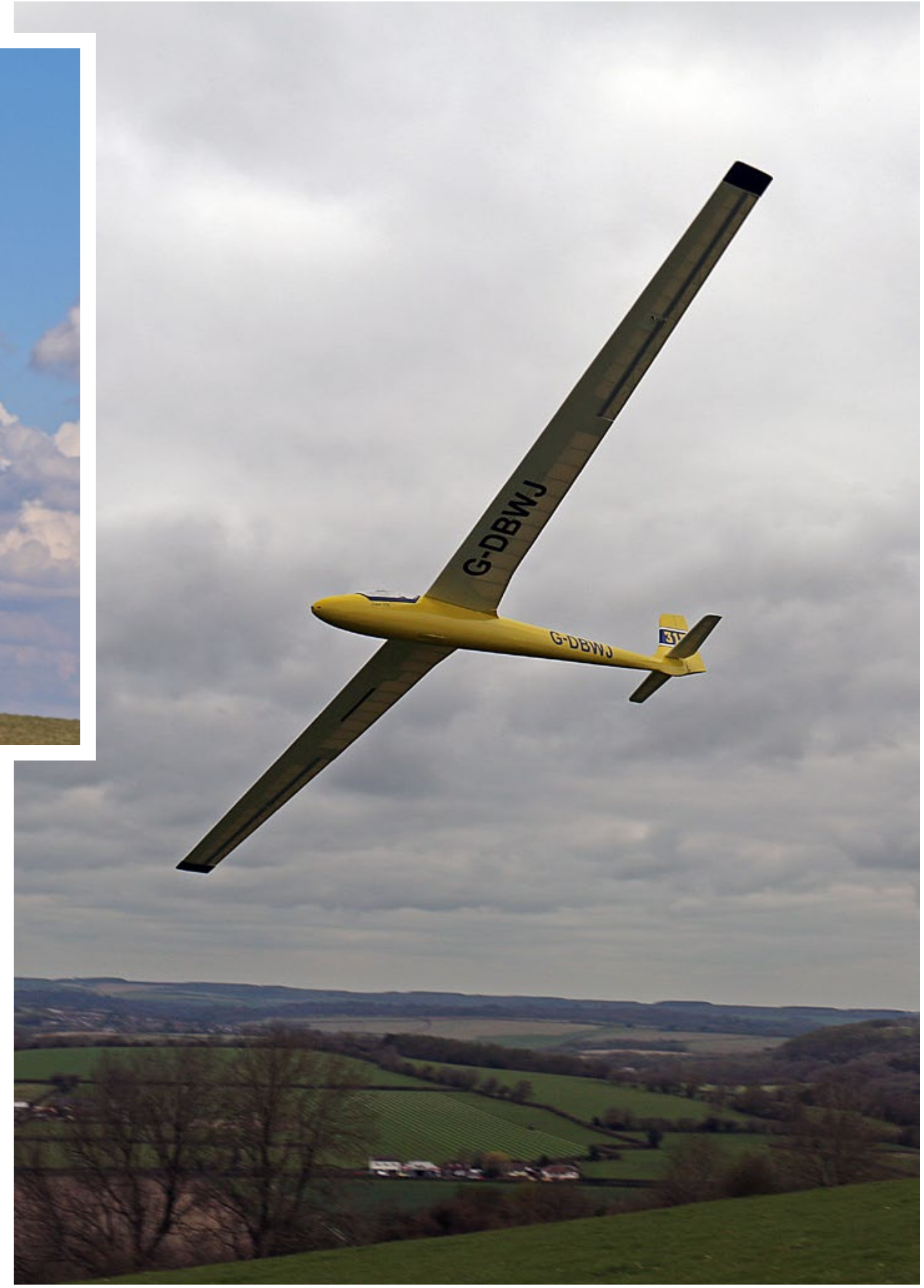
Where it all started. Two Dusters, 1/7th & 1/5th scale.

Smallpiece gives the Dart a professional launch.
Note the yellow propeller folded against the nose.

The Dart in action in glider mode.

So, given that slope opportunities have become few and far between, what about those days when the wind is on the slope, but light, and it would take a brave soul to launch off, faced with the possibility of landing out rather than landing on?

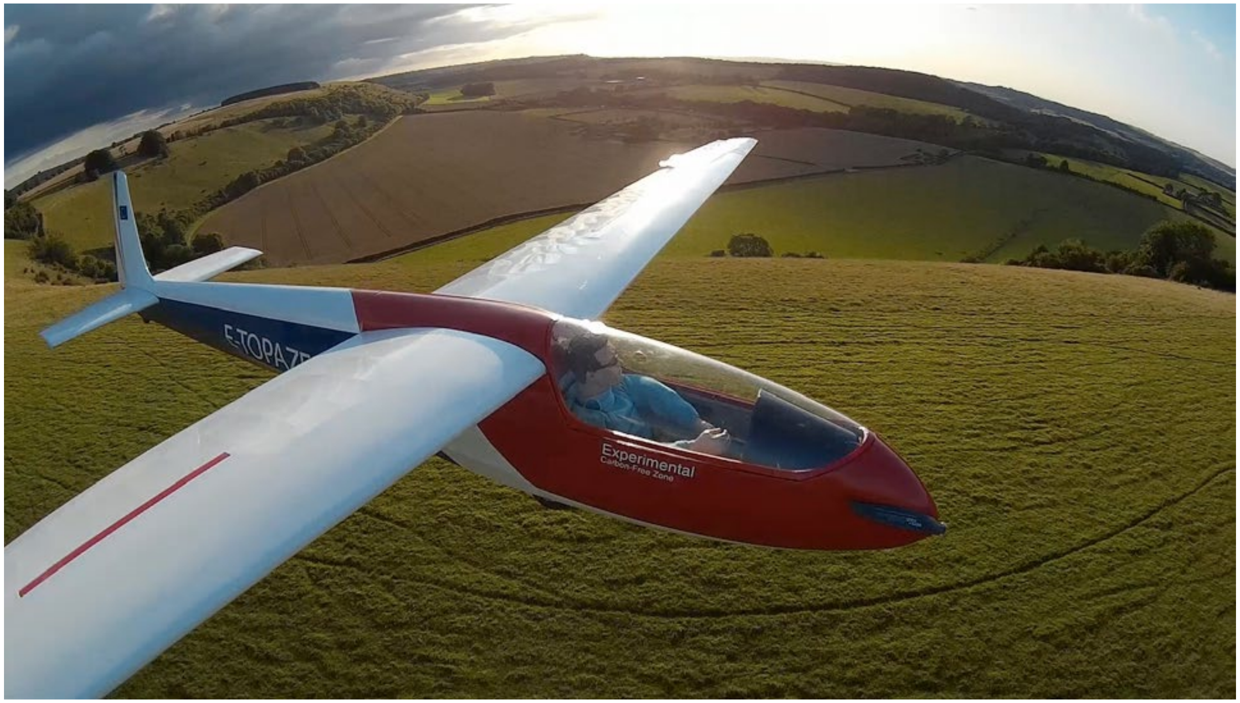
I should point out that landing out, especially to those of advancing years, is not a prospect to be contemplated lightly. By the time you have staggered to the bottom of the hill, the knees will have turned to rubber. Now you have to negotiate wild shrubbery, a barbed wire fence, an ocean of stinging nettles, and the task of finding your beloved model



A scenic shot of the Dart at a Wessex Soaring Ass'n site.

Inset: Bergfalke 4 launch. Self-launching at this size is reasonably practical.
Main: Too low at White Sheet:. Time to throttle up!

Zugvogel launch. It's often safer to launch a large model powered up.



Another light air evening session.

in a dense field of corn or barley: not a deed that will garner approval from the hard-working farmer.

Having found your model, its time for the journey to be reversed, with the addition of a large, awkward, and puzzlingly twice-as-heavy glider.

Now your ancient lungs will be put to the test, as your legs seem to become a year older with every step and you start to sound like a steam engine with a secret sorrow.

At least, you say to yourself, I can count on my pals for sympathy and support, just as howls of derision reach your ears from the safety of the top of the hill.

As you can see, the pleasures and perils of flying in such conditions can be balanced one way or the other, so what if pleasure could win the day…?

When I was ejected from the world of work into retirement some five years ago, one of the items on my bucket list was to find out what all the fuss concerning electric flight was about.

Coincidentally, my own slope soaring club, the White Sheet Radio Flying Club (the word Radio tells how old this institution is!), was trialling the use of electric assist models for use on the slope.

Firing up the PC, I set to designing a couple of small versions of the BJ1 Duster, each with a moustache on the front end.

Encouraged by the result, I then went off at a tangent and designed a couple of different sized versions of the Kaiser K11 motorglider.

Before I could stop myself, a quarter scale Fournier RF5 appeared, but none of this was really tackling the original question.

Then, a moment of epiphany…

My pal Motley Crew did the unthinkable: he electrified one of the huge Phoenix K8's that were all the rage at the time. (This was when they were starting to fall out of the sky. Motley stripped his, added some proper wing spars and coined the phrase "Certificate of Mottification.")

We found ourselves, late one summer afternoon, on the edge of the hallowed SW bowl of White Sheet Hill with said model.

The Zugvogel looking innocent at White Sheet!

The wind was on, but somewhat lacking on oomph, sometimes going off for a well earned rest. An invisible message passed between myself and the third member of our little gang, Barrington V. Smallpiece: he gasped and grabbed his ankle, I grabbed the transmitter, and the Herculean task of launching the monster was left to Motley.

Once in the air, a short burst of power saw the K8 safely above the horizon and the fun started.

Given the conditions, the usual howl of the wind in the earholes was notably absent, and as the big model aviated by us in a series of low passes, we heard the siren song of the airstream being gently modulated by those tiny control movements so necessary to flight, and as she whispered by, it almost seemed as if the model was alive. It was an electric moment (pun not intended) and the die was cast... I wanted some of that!

Back home, the excitement still buzzing (darn it, another pun!) I cast around through my design back-catalogue, looking for inspiration.

It came in the form of the 3.5 scale Slingsby Dart, surely a contender? Using the Turnigy G60 to turn the prop, the Dart was an immediate winner, displaying all the visual and sonic themes of the K8, but at a much more manageable size.

Motley gives the Javelot a manly launch.

Faster than you can blink, along came an E-assist version of my Bergfalke 4, also a winner. You'd think I would be satisfied now, wouldn't you, but the scale policeman that lives in the head of all scale modellers started getting nasty, pointing out that the Dart and the Bergfalke's face furniture was definitely not scale, and even removing the propeller couldn't make it so.

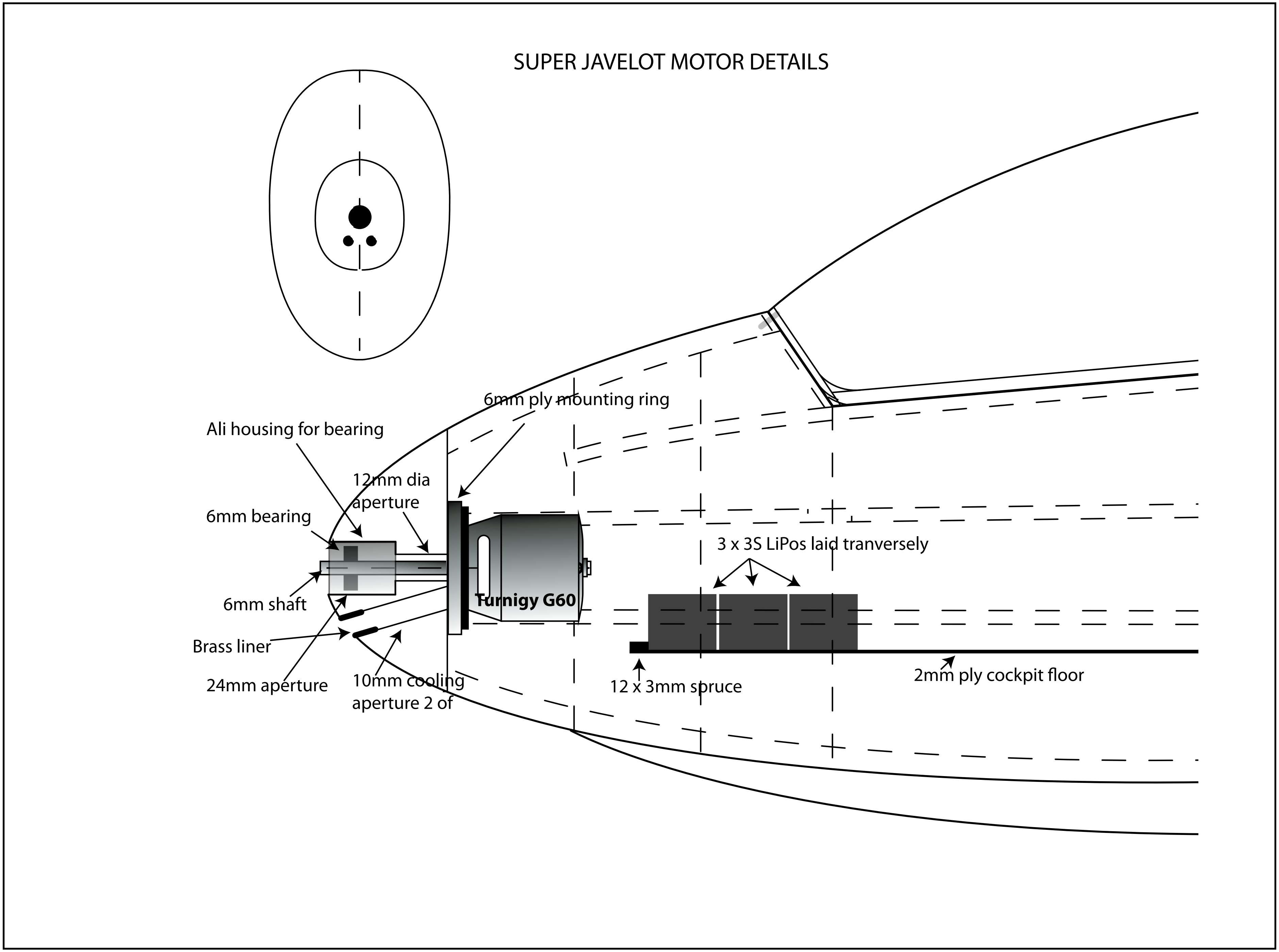
Luckily, Smallpiece, a retired engineer, came up with a plan, and I set about putting it into practice on the next design, the Scheibe Zugvogel.

This is how it works…all my gliders have a solid nose block, made up from

Left: Super Javelot. You can go back on approach as far as you like, knowing you'll make it back to the landing area.

Below left: The Super Javelot with the prop removed and the blanking plate fitted

Below: Power train layout in the Super Javelot


SUPER JAVELOT MOTOR DETAILS
6mm ply mounting ring
Ali housing for bearing
12mm dia
aperture
6mm bearing
6mm shaft
Turnigy G60
3 x 3S LiPos laid tranversely
Brass liner
24mm aperture
10mm cooling
aperture 2 of
12 x 3mm spruce
2mm ply cockpit floor

several applications of car body filler. A suitable hole is drilled through the nose into the fuselage bulkhead, followed by two further holes lower down to allow the ingress of cooling air.

The motor is handed to Smallpiece, who removes the original drive shaft, and inserts a longer one, facing the other way. He also supplies a bearing to support it at the front, and an aluminium housing to support the bearing.

The housing is inset in the nose in order to swallow most of the propeller gubbins, leaving the prop flush with the nose, all nice and neat.

Now for the *piece de résistance*: with the prop removed, a blanking plate is made up to fit over the prop shaft, the length of which finishes flush with the nose. Voila! Only a close inspection will show that something un-scale lurks inside, and when the wind blows, the model reverts to being a glider *ordinaire*. So excited by this anesthetising of the scale policeman in my head, two more models quickly followed, the WA 22 Super Javelot and Scheibe LC10 Topaze.

Smallpiece's genius knows no bounds: he also came up with the all-aluminium-sideways-tow-release, thus allowing E-Assist gliders to be aerotowed as well, and therefore overcoming the problem of all the ironmongery at the front end getting in the way of a conventional release. (I wonder if the release will now cost 25% more with all the tariffs' flying about? (Can you believe it? Another pun!))

Where it started: Motley's mighty E-Assist K8.

Let me set forth a scenario for you… Imagine two scale soarers launching in quick succession off the hillside, one with E-Assist and one without. The wind is on the slope, but is fitful and full of lethargy.

At first the lift is good and allows both models to get above that all-time regulator of good and bad, the horizon. Then, reality bites, and both models start sinking. My stance is one of relaxation, the other guy has started to stiffen and breathe a little more heavily. Never mind, the lift will pick up again in a minute or two, won't it?

Operating from the hill allows for repeated close-proximity flying.

Both models sink lower. If I was the other guy, I would have plonked my model down by now, somewhere, any where, but he's an optimist.

Time to bail out: I open the throttle. With the motor set up I currently use, even full throttle produces only a pleasant low hum, unlikely to annoy even the most ardent E-Assist critic. A six second burst sees the model some 200 feet above the horizon, and settling down once again to glide mode.

The sun is getting low, we're in the middle of nowhere, the only sounds are gentle lowing of the cattle, the hum of insects, and the ancient sound of the Sailplane Song, a whispering atmospheric melody in C Major.

A quick loop, and the key changes to a higher pitch as the glider whistles around like a leaky kettle. One more burst of power sees her set up for a landing, the airbrakes adding some zest to the orchestra, and the ghostly overture ends as the wheel gently touches the grass.

As I sit there afterwards, draining the remains of the coffee flask, I ruminate that if this was heaven, it would be well worth praying for.

I hear a gasping, wheezing sound as the other guy finally makes it back to the top. I know him well, it's the me of Christmas Past, but I am older and wiser now, right?

Full circle: The author's current project, a 1:3.5 scale BJ1 Duster for E-Assist.

Tailpiece: don't just take my word for the foregoing: it's all been recorded for posterity and uploaded to YouTube. Just Google the following:
E-DARTIFICATION!
E-BERGIFICATION!
The Zugvogel flies
Airborne with the Super Javelot

THE TOPAZE GOES ELECTRIC
Wassmer WA-22 Super Javelot Specs:
Scale: 1:3.25
Span: 4.6m
Weight: 9Kgs (20lbs)
Wing section: HQ35/14 (C-Section)-12(Tip)
Turnigy G60 Brushless Outrunner 500kv
Turnigy Brushless ESC 85A w/ 5A SBEC
14/8 folding prop
2 x 3s 2200 Lipos

The Topaze in glider mode.

PIERRE RUAT'S ASH 30 MI

Wingspan: 8.40m
Surface area: 165 dm^2
Weight: 20.8 Kgs
Wing loading: 126 grs/dm^2

Motor: Turnigy Aerodrive SK3 - 6374-192kv Brushless Outrunner
Battery: Turnigy LIPO: 12s 5000mAh
Speed control: 12s 100A
Propeller: RFM 20x13

Transmitter: Graupner MC32.
Servos: 5 servos/wing (10), 1 rudder, 2 elevator, 1 retracts, 1 tow release.


ASH 30 Mi


ASH 30 Mi
PR
CAP
By Pierrot
PORSCHE
INTELLIGENT
PERFORMANCE


ASH 30 Mi
PR


PORSCHE
INTELLIGENT
PERFORMANCE
ASH 30 Mi
PR
By Pierrot
CAP
63

A little known and seldom modeled surveillance aircraft from the former Soviet Union. Myasishchev M-17 text from <http://oruzhie.info/voennye-samolety/387-m-17-stratosfera>, translated from Russian to English by Google Translate. Myasishchev M-55 text from <https://en.wikipedia.org/wiki/Myasishchev_M-55>.

Slope Soaring Candidate

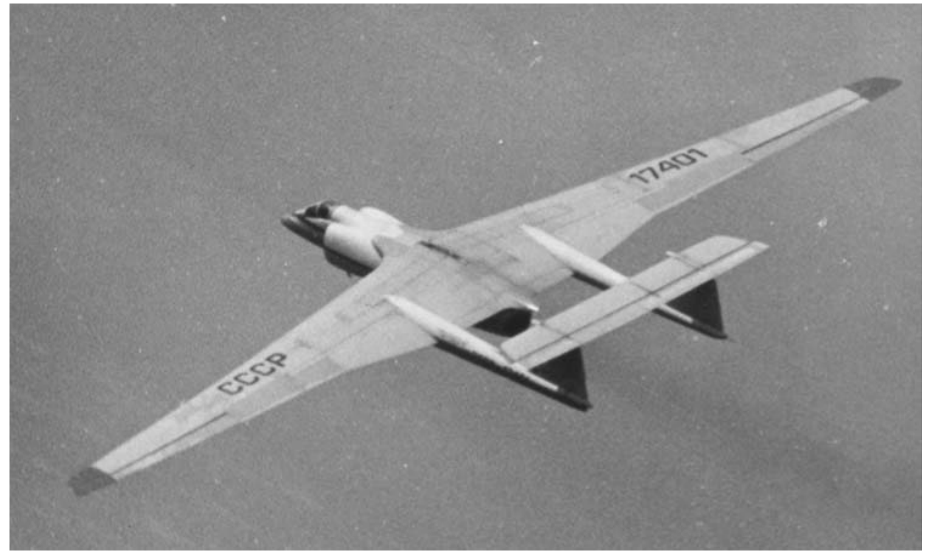
Myasishchev M-17 Stratosphere

M-17 *https://img-fotki.yandex.ru/get/53078/310023662.3ca5/0_7a3e7a_8421dc45_orig*

For the first time the idea of creating a high-altitude aircraft in the designer VM. Myasishchev matured in the late 1930s, and the development of the high-altitude bomber DVB-102 began in the Sharag, the NKVD prison, officially called the Central Design Bureau of the Central Design Bureau-29. In the late 1960's. the world was in a military confrontation between the two countries - the US and the USSR. US high-altitude reconnaissance aircraft U-2 constantly made flights over our country. On May 1, 1960, one of them was shot down near Sverdlovsk.

Having thoroughly studied the remains of what was left of the plane during the fall, examined the structure and even restored the profile of its wing. V.M. Myasishchev, having assembled a small group of specialists, set the task for them: to work out a possible aerodynamic configuration of an aircraft capable of flying in the stratosphere with the lowest subsonic speed. The designer outlined the scheme of the aircraft being developed: a straight wing of a very large extension, a high weight return, an engine capable of operating at high altitude. The specialists of TsAGI calculated the U-2 flight data and obtained a maximum flight altitude equal to 21 km, but V.M. Myasishchev thought this was not enough, more was needed. The main thing for such a flight is a good wing profile and an engine whose thrust, when flying in the stratosphere because of the decrease in air density, which is only 3% of the thrust of the engine on the

M-17 https://1.bp.blogspot.com/-SavgM7H_1Fc/TaB25ngyyEI/AAAAAAAABIys/uikgRAEQdwc/s1600/M17-bia.jpg



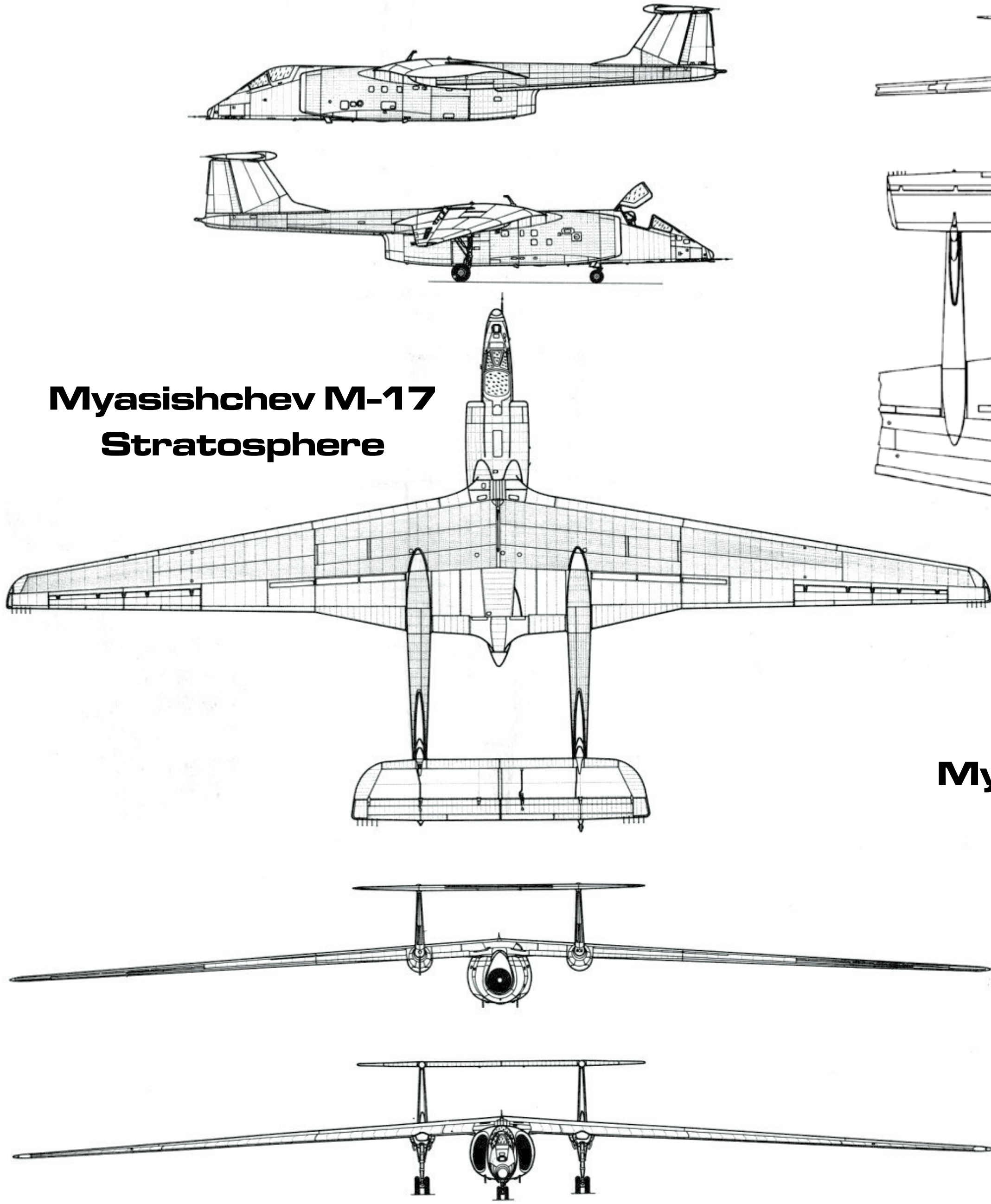
M-17 http-//airwar.ru/image/idop/spy/m17/m17-11.jpg

ground. The work started in the OKB named "Tema-17," and the future aircraft - M-17.

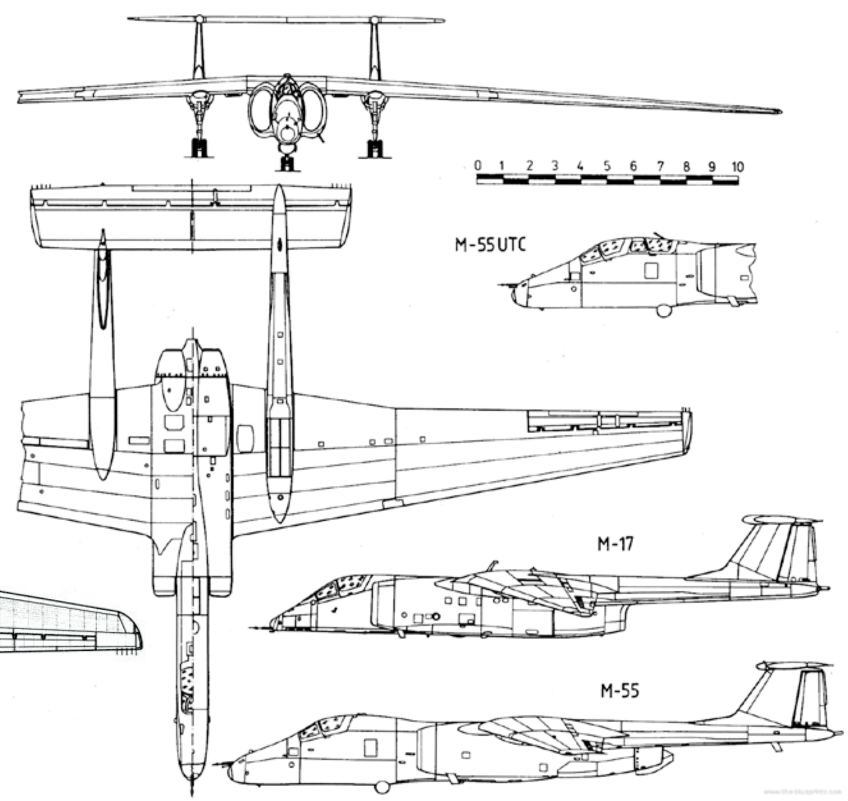
The development began M-17 with aerodynamics of the wing, which should have a lift factor of the order of 1.0, which is necessary for cruising at high altitude. As a result of theoretical and experimental studies conducted jointly by the specialists of OKB and TsAGI, the profile of the new series was developed. But it soon became clear that at low altitudes the aerodynamic profile quality was dropping, which led to high fuel costs and a significant narrowing of the flight regimes. M-17 picked up the same disease that chronically suffered U-2. Experts still found a way out, it was proposed retractable mechanization of the trailing edge of the wing. This allowed to reduce its area and concavity depending on the flight mode. The pilot of the aircraft, as he ascends, pushes out sectional mechanization, increases the wing area, changes concavity, Flies at the maximum quality - by the so-called "envelope polar." This decision made it possible to fly at altitudes from 0 to 25 km. The created design on May 21, 1971 was protected by copyright certificate.

The power plant of the M-17 airplane consists of one RD-36-51V jet engine designed by Rybinsk Design Bureau P.V. Kolesova. The installation of one engine determined the layout of the future aircraft, in the case of a normal scheme through the entire fuselage it would be necessary to drag the pipe to organize the nozzle (as on U-2). In the final version, it was a two-beam structure with a high directional, large elongation, having a supercritical profile, and with a short fuselage.

The work was conducted in Kumertau (Bashkiria) at a helicopter plant and went rather slowly, as it was new for the plant and was passed with errors and alterations. At the course of the work, the sudden death of V.M. Myasishchev in October 1978. Sokolov became the new head of the topic. The first prototype during the tests crashed. But the work was continued, two more copies were built, one for static testing, another for flight tests. The testing of the aircraft showed its great potential. In 1990, the



Myasishchev M-17 Stratosphere



Myasishchev M-55 Geophysica

pilots EMZ them. V.M. Myasishchev set 25 world records of height, speed and carrying capacity for cars weighing 16-20 tons. The maximum height of the horizontal flight was 21,800 m. Due to the conversion, the range of the aircraft's tasks expanded, one of which was the study of the ozone layer over Moscow within the framework of the Global Ozone Reserve project.

M-17 http-//oruzhie.info/images/stories/m-17/m-17-stratosfera-samolet-07.jpg

M-55 https-//upload.wikimedia.org/wikipedia/commons/4/46/Myasishchev_M-55_Geophysica%2C_MAKS_2001.jpg

Specifications

	Myasishchev M-17 Stratosphere	Myasishchev M-55 Geophysica
Wing span	40.32 m (132 ft 3 in)	37.46 m (122 ft 11 in)
Length	22.27 m (73 ft 1 in)	22.867 m (75 ft 0 in)
Height		4.8 m (15 ft 9 in)
Wing area	137.7 m2 (1,482 sq ft)	131.6 m2 (1,417 sq ft)
Aspect ratio	11.9	10.6
Airfoil	P-173-9	
Empty weight	1,900 kg (26,200 lb)	13,995 kg (30,854 lb)
Gross weight	18,400 kg (40,600 lb)	23,400 kg (51,588 lb)
Powerplant(s)	1 × 117.2 kN (26,300 lbf) Kolesov RD-36-51	2 × Soloviev D-30-V12 low-bypass turbofan, 93.192 kN (20,950 lbf) thrust each

M-17 http-//oruzhie.info/images/stories/m-17/m-17-stratosfera-samolet-04.jpg

M-17 http-//oruzhie.info/images/stories/m-17/m-17-stratosfera-samolet-06.jpg

Myasishchev M-55

The M-17 (originally designed as a balloon-interceptor) was terminated in 1987 and replaced by the M-17RN, later known as the M-55 Geophysica, which was dubbed by NATO Mystic-B. [2] First flown on 16 Aug 1988, the M-55 airframe was revised further with a longer fuselage pod, housing two Soloviev D-30-10V un-reheated turbofan engines, shorter-span wings and comprehensive sensor payload.

The M-55 set a total of 15 FAI world records, all of which still stand today: On 21 September 1993, an M-55 piloted by Victor Vasenkov from the 8th State R&D Institute of the Air Force named after V. P. Chkalov at Akhtubinsk reached a class record altitude of 21,360 m (70,080 ft) in class C-1j (Landplanes: take-off weight 20,000 to 25,000 kg (44,000 to 55,000 lb)).

A dual-control version, the M-55UTS, was developed by adding a second cockpit behind the original, displacing some avionics and/or sensor payload.

A number of M-55 Geophysica remain in service, performing in research roles; one M-55 took part in a study of the Arctic stratosphere in 1996–1997, with similar experiments performed in Antarctica during 1999.

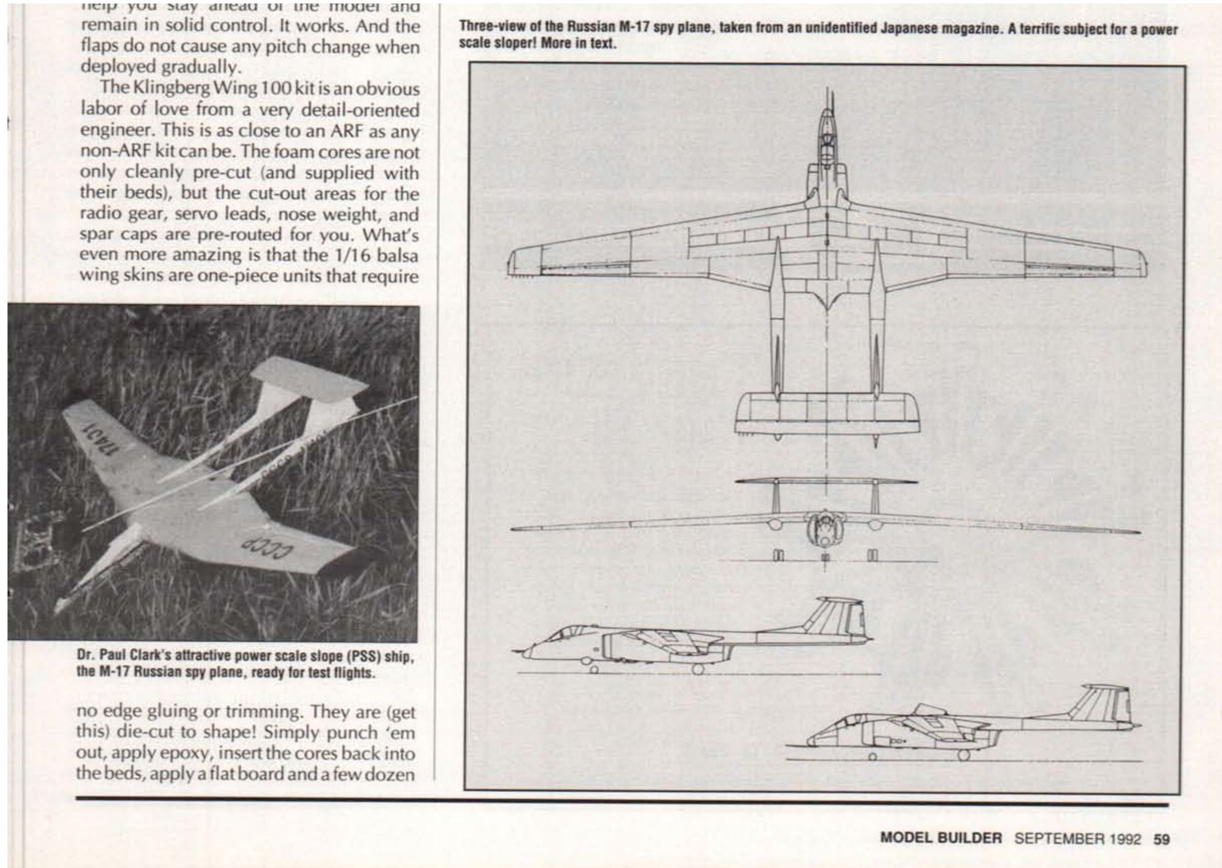
An Irish-headquartered company Qucomhaps, with a focus on South East Asia, has entered a 1-billion USD deal to use the M-55 as a high-altitude platform station for digital communications.

There is a bit of confusion regarding the Myasishchev M-17 in the literature we examined, with that aircraft being given the M-55 name “Geophysica.”

The September 1992 edition of *Model Builder* featured an RC model of the Myasishchev M-17 built and flown by Dr. Paul Clark of Osaka Japan.

In his RC Soaring column Bill relates Paul found 3-view plans in a Japanese

KOKU-FAN December 1990



help you stay ahead of the model and remain in solid control. It works. And the flaps do not cause any pitch change when deployed gradually.

The Klingberg Wing 100 kit is an obvious labor of love from a very detail-oriented engineer. This is as close to an ARF as any non-ARF kit can be. The foam cores are not only cleanly pre-cut (and supplied with their beds), but the cut-out areas for the radio gear, servo leads, nose weight, and spar caps are pre-routed for you. What's even more amazing is that the 1/16 balsa wing skins are one-piece units that require

Dr. Paul Clark's attractive power scale slope (PSS) ship, the M-17 Russian spy plane, ready for test flights.

no edge gluing or trimming. They are (get this) die-cut to shape! Simply punch 'em out, apply epoxy, insert the cores back into the beds, apply a flat board and a few dozen

Three-view of the Russian M-17 spy plane, taken from an unidentified Japanese magazine. A terrific subject for a power scale sloper! More in text.

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Paul Clark's M-17 model and the 3-view which served as inspiration.

publication, KOKU-FAN December 1990, and constructed a quite pretty 60" span model. Bill was impressed with the twin booms, the T-tail arrangement, and the multi-taper multi-sweep wing and pod fuselage, stating it was very unique.

Five different free flight models, each with different dihedral plans, were built and flown before Paul constructed the final model - anhedral as per the real aircraft, simple V-dihedral, gull wing with anhedral, polyhedral, and finally a flat center section with dihedral in the tip panels. The latter configuration was chosen as, in Paul's words, "Would always climb. Without question was most lifting."

The primary construction material was balsa and the wing used the Selig-Donovan 7032 in the main panels and the SD-6060 in the tip panels.

Paul reported the model to be a very good and responsive flyer, so a larger scale version should be an even better performer.

Aerotow candidate

Maupin Carbon Dragon

Kyle Kroker, kylekroker@yahoo.com, has had a decades-long intense interest in the Carbon Dragon ultralight glider designed by Jim Maupin and Irv Culver. Kyle is now in the process of designing a 1:3 scale model of the Carbon Dragon and has asked for assistance from the RC soaring community. Our initial correspondence with Kyle has guided him toward a model which will be a true miniaturization of the original, including full span flaperons and the unique Carbon Dragon spoiler system. He is now researching servo options and is looking for assistance from others with experience in large scale aerotow projects.

The Carbon Dragon looks to be an exceptional modeling opportunity and we've found ourselves eagerly researching the design following Kyle's initial request for help. While both full size and 1/4 scale plans for the man-carrying aircraft are readily available on the internet, there are few quality Carbon Dragon photos. Additionally, there are differing values for control surface deflection angles, in particular the full span flaperons. We'll cover those descrepencies.

First, let's take a look at the dimensions of the Carbon Dragon as envisioned by Jim Maupin.

Span	44' 0"
Length	19' 2"
Horizontal stabilizer span	10' 0"
Wing root chord	60"
Wing tip chord	22"
Flaperon chord	30% local chord
Vertical stabilizer height:	5' 9"
Empty weight	~145 lbs.
Gross weight (max.)	~340 lbs.

Kyle's 1/3 scale model will span 176" and have a length of 76.7". Total weight of the model should less than 1/27th of the 340 lbs. maximum gross weight of the full size aircraft, 12.6 lbs. This goal should be achievable if the construction materials and the construction methods are carefully chosen.

Irv Culver and Jim Maupin

From <https://www.ihpa.ie/carbon-dragon/index.php/cd-builders/jim-maupin-s-prototype-cd>, original on Jim Maupin's Carbon Dragon web page:

The Carbon Dragon is best described as a "foot-launch able sailplane" although it meets the FAI definition of a hang glider, and neither glider nor pilot need to be licensed. It can be launched by foot, auto tow, air tow or bungee. It has superb climbing ability, and will soar in extremely light conditions. It soars in lighter conditions than any other soaring aircraft available today. It has significantly exceeded world record and out-and-back flights in its class.

Jim Maupin's original concept was a design with a 40 ft. wing span and a sailcloth flap that would roll up on a roller inside the wing, changing the area from 100 to 140 square feet and back again. After the tail boom and horizontal tail were already built, he was still struggling with the wing design. With the help of his friend and consultant, aerodynamicist Irv Culver, a new wing was developed with airfoils by Irv. It has a span of 44 feet. It has 30% chord, full span flaperons. As flaps, they operated from -5° to +15°. As ailerons, they have a 4 to 1 differential and operated from 4° down to 16° up. They are driven by two vertical push rods operating inside the fuselage... simple!

In flight the pilot is totally enclosed. The cockpit area is 17 inches wide in the area of the pilot's hips. Twelve inches above this in the shoulder, arm and elbow area, it is 25 inches wide. The structure consists of two triangular torque boxes down each side. The landing gear door is hinged on one side. When closed and latched, it is a 7.5G structure like all the rest. The glider lands on a wheel on the bottom of the door. The door extends some distance behind the pilot. If he stumbles and falls forward, his body goes up inside and the airframe hits the ground -- the pilot does not get a 145 lb. glider on his back.

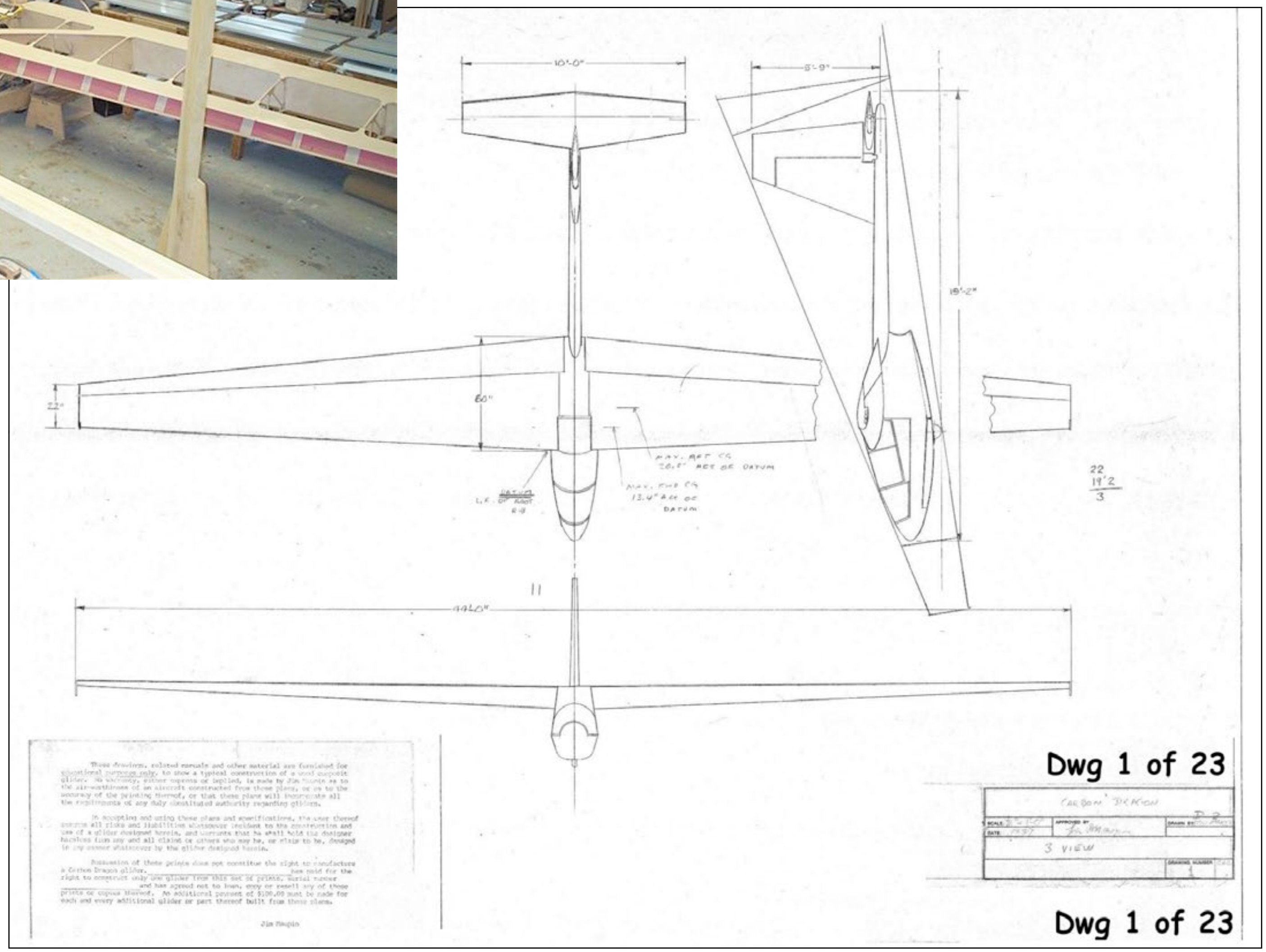
In construction, the glider is basically a wood fabric sailplane, with judicious use of carbon for significant weight savings and to produce adequate stiffness. The wing and tail spar caps are constructed of carbon. The tail boom is an elliptical carbon tube made in two halves inside a simple mold. The control torque tubes are carbon formed over aluminum tubes, after which the aluminum is removed with swimming pool acid. The flaperons are each 22' long and driven from the inboard. They are carbon - wood is strong enough, but not stiff enough to avoid flutter. The rest of the structure is pretty straight forward. Wing ribs forward of the spar are band sawed from 1/4" 5-ply mahogany. Aft ribs are built up from 5/16" square spruce. Covering is dacron. The whole glider is designed to 7.5 G's ultimate, and has been proof loaded to the 5.0 G limit load. Time to build is approximately 1,500 hours, and a current builder estimates the cost to be about $3,000, minus instruments.

All the early flights tests were done in the Tehachapi Valley. Airport altitude is 4,200 feet and density altitude varies up from that depending on temperature. Although the Carbon Dragon has been successfully launched by the auto tow, aero tow, bungee and foot, however, most of its flights were made by auto tow.

The pilots who have flown it agree that the performance figures are realistic. It loses about 20 feet in a 360 turn. The stall is gentle and straight. The side stick seems totally natural. No one commented on it, though it was the first time many of them had flown with a side stick. Probably this is because time control pressures are very light.

http://www.carbondragon.us/oz_first_assembly_1024x680.jpg

Ozzie Haynes' Carbon Dragon before covering and installation of full span flaperons. Note the drag spar and gusseted truss construction of the wing ribs aft of the main spar.
Photo by Alan Sayers

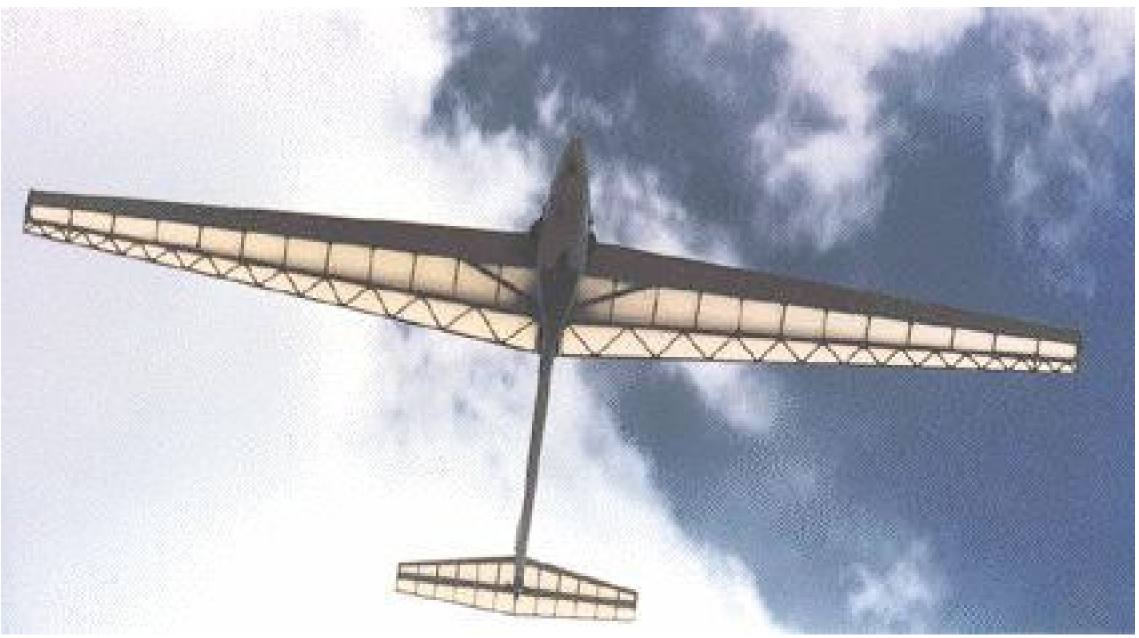


Carbon Dragon 3-view from the full size plan set.

https://www.ihpa.ie/carbon-dragon/images/carbon-dragon/CD%20Blueprints/Carbon%20Dragon%20-%20full%20scale%20blueprints.zip

http://www.ihpa.ie/carbon-dragon/images/carbon-dragon/CD%20Banner%20Photos/cd-banner-10.jpg

Gary Osoba flying Jim Maupin's prototype Carbon Dragon in Kansas.

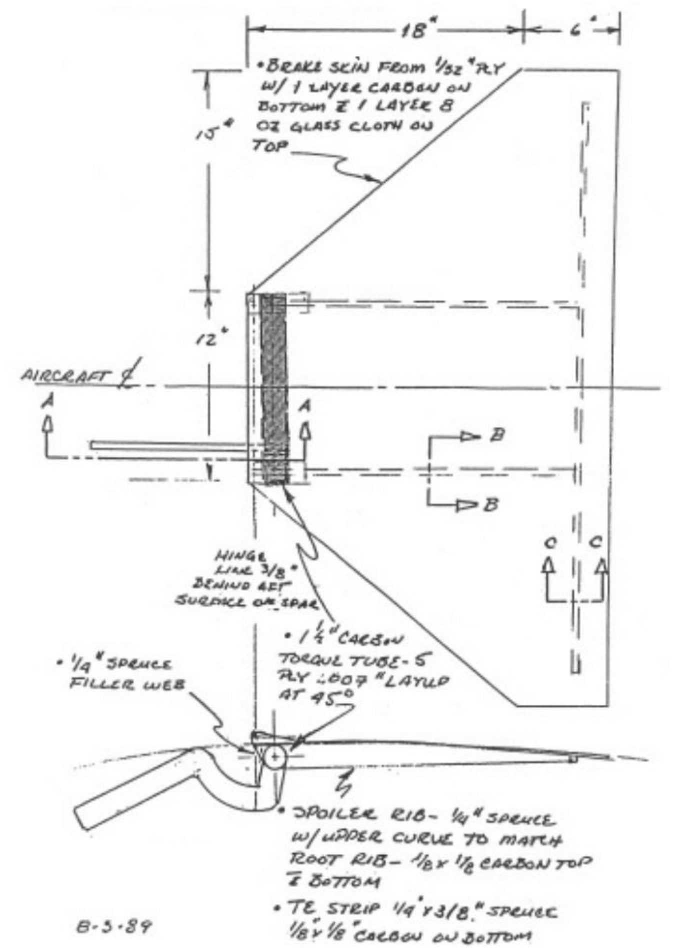


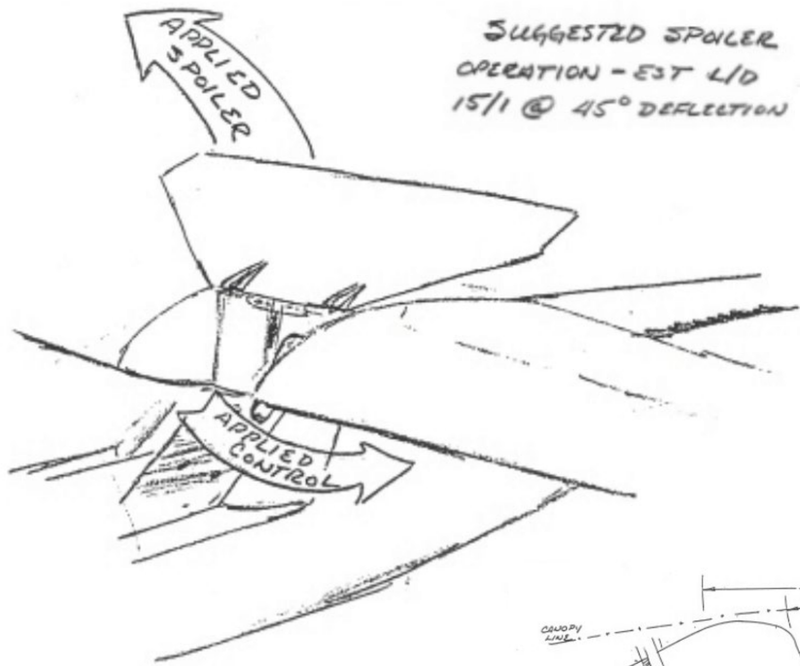
http://www.ihpa.ie/carbon-dragon/images/carbon-dragon/CD%20Banner%20Photos/cd-banner-10.jpg

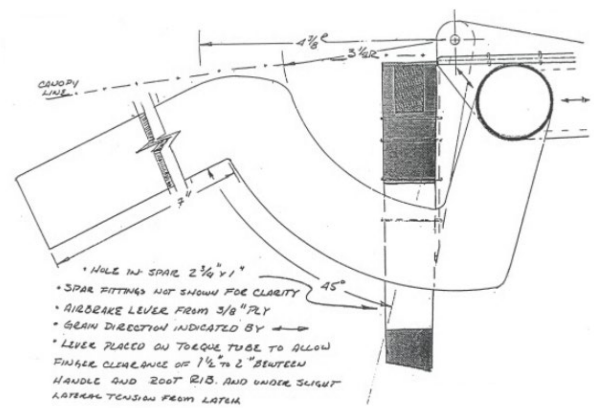
Gary Osoba flying Jim Maupin's prototype Carbon Dragon in Kansas.

https://www.bydanjohnson.com/wp-content/uploads/2016/08/690_4.jpg

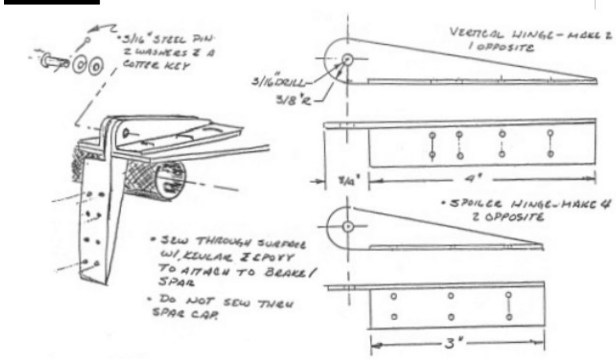
Spoiler deployed. An overhead lever is pulled down and back to actuate the spoiler, so the spoiler deflection angle (and effectiveness) is under direct control.







Sketches of the spoiler as depicted in the Carbon Dragon Builders Manual*. The spoiler is constructed of 1/32" plywood with "1 layer carbon on bottom" and "1 layer 8 oz glass cloth on top." Spoiler ribs are 1/4" spruce with upper curve to match the root rib and 1/8" x 1/8" carbon top and bottom. The trailing edge strip is 1/4" x 3/8" spruce with 1/8" x 1/8" carbon on bottom. The handle extends through a hole in the spar and is attached directly to the spoiler through a torque tube assembly. The handle rotates the torque tube/spoiler through a 45 degree arc and the glide angle is reduced from ~25:1 to ~15:1 with the spoiler fully open.*



Lee Chaplin's 1/4 scale Carbon Dragon with separate flaps and ailerons on final.

From Lee Chaplin's March 16 2014 post on RCGroups <https://www.rcgroups.com/forums/showthread.php?2125592-Carbon-Dragon#post29272336>:

I built my model using 1/4 scale study plans available on this website <http://www.ihpa.ie/carbon-dragon/>.

In the full size plans not everything is drawn full size, but all of the information was there to create plans for my model.

• Wing span 132" Area 1375 square inches, Eppler 197 airfoil (not scale).

• Wt. 7 lbs. 11 oz. Wing loading 13 oz per square foot.

• Boom is round tapered carbon fiber, The bottom section of a fishing pole. Quite stiff, does not flex. The original had a hand laid up elliptical carbon fiber boom.

Construction:

• Pod: Ply bulkheads sheeted with 1/32" ply and glassed

• Wing: .188" x .500" spruce spars capped with 3/32" balsa and .004" thick carbon fiber. Trailing edge of wing is .045" x .500" carbon, (CST) made a stiff and straight trailing edge that did not flex under covering. The full size had full span flaperons, I built mine with separate flaps. My flaps are programed to move 50% of the ailerons and while not scale I prefer the separate flaps as you have more options.

• Tail: Balsa built up with the same .045" x .500" carbon trailing edge from CST.

This model was test flown at Point of the Mountain (ridge soared) in Draper, Utah. She flew very well, similar to my TMRC Cherokee but is a little more sensitive in roll probably due to the wider ailerons and the 50% aileron throw programed into the flaps.

Handled very well and slows down to a crawl with the flaps deployed. My Cherokee is about a lb. heavier and has 100 less square inches of wing area and thermals well, so I have high hopes for the Carbon Dragon.

In a later post Lee says his Carbon Dragon flies well in slope lift of 10 mph and can probably still do well in winds down to 5 mph. This performance is no doubt due to the light wing loading and the fully enclosed cockpit which reduces drag considerably over that of an open cockpit with a simple windscreen.

https://www.ihpa.ie/carbon-dragon/index.php/cd-builders/gregory-gus-malm

A rear view Gregory (Gus) Malm's powered Carbon Dragon also in the photo at upper right. Climb rate of 500'/min on a 10 hp single cylinder 2-stroke embedded in the port wing root with belt reduction drive to a 64" folder. Here you can also see the underside of the unique spoiler.

http://www.ihpa.ie/carbon-dragon/images/carbon-dragon/CD%20Banner%20Photos/cd-banner-14.jpg

Carbon Dragon with propeller mounted on the left wing.

http://www.ihpa.ie/carbon-dragon/images/carbon-dragon/CD%20Banner%20Photos/cd-banner-18.jpg

Carbon Dragon with the engine mounted on a pylon.

Regarding those control surface deflection angle conflicts, here's what two sources had top say:

<https://www.ihpa.ie/carbon-dragon/index.php/cd-builders/jim-maupin-s-prototype-cd>: " It has 30% chord, full span flaperons. As flaps, they operated from -5° to +15°. As ailerons, they have a 4 to 1 differential and operated from 4° down to 16° up. They are driven by two vertical push rods operating inside the fuselage... simple!"

However, there's Jim Maupin's article in *Technical Soaring* (Volume X No. 3) in which he says "flaps 12 degrees down, 4 degrees up, ailerons 4 degrees down, 24 degrees up." Probably the way to go for a model.

As can be seen by the photos on this page, a self-launching model of the Carbon Dragon which replicates an actual full size aircraft is entirely possible, although finding documentation sufficient for scale competitions may pose difficulties.

Carbon Dragon pod. Note foot-launch door.

Cockpit detail. Note hand-slot for holding fuselage during foot-launch.

Stéphane Abbet's Carbon Dragon project in Geneva, Switzerland

Right wing.

Carbon Dragon partially assembled with left wing attached.

Internet resources:
https://en.wikipedia.org/wiki/Maupin_Carbon_Dragon
http://www.carbondragon.us/
https://www.ihpa.ie/carbon-dragon/
http://journals.sfu.ca/ts/index.php/ts/article/view/848/804
https://experimenter.epubxp.com/i/254584-february-2014/30

Andy Meade's impressive 72" Vulcan built from the South Herts Models plan. Andy enjoyed a lengthy mission out over the sea. Photo taken at the 2017 PSSA "Fly for Fun" event sponsored by the Lleyn Model Aero Club, Lleyn Peninsula, North Wales, by Phil Cooke, webmaster@pssaonline.co.uk.
Canon EOS 7D, ISO 100, 1/1250 sec., f7.1, 320 mm