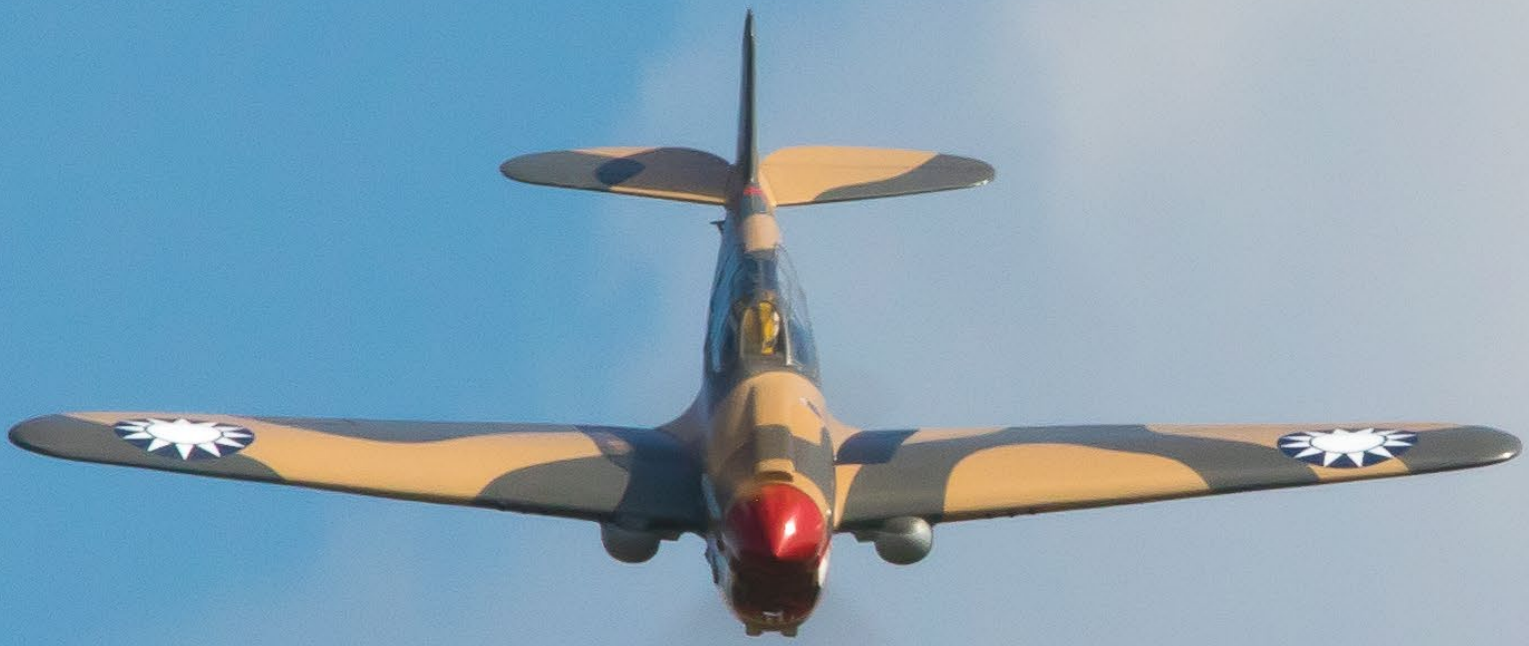
Glitch Busters

July 2018

WARBIRDS OVER DELAWARE

IS HERE BABY!

July 11 - 14, 2018



SWAP MEET
November 3, 2018

NEXT MEETING
Saturday, July 7th at Noon
at the Flying Field

AMA #197

UPDATE ON FIELD USE

We received an email from a club member who was concerned that visitors to our field would have to be members of both the AMA and the club. This is not the case. People who only come to watch us fly are always welcome, and do not require either AMA or club membership. Visitors who wish to fly must have AMA membership, and be a guest of a club member.

FROM THE EDITOR'S DESK

Have you ever wondered why the wing loading (weight of the plane divided by the wing area) of large models seems to be so much higher than those of smaller models? It turns out that wing loading is great for comparing models of the same relative size, but not so good for comparing models of significantly different size. Enter the concept of Cubic Wing loading. This month we have an article originally posted on the East Bay R/C web site, and which they graciously let us reprint here. We hope you find it helpful.

CUBIC WING LOADING - by East Bay Radio Controllers

Most RC fixed wing fliers are familiar with the idea of wing loading which is the plane weight divided by the wing area as seen from the plans. There is also another kind of wing loading, cubic wing loading that has some additional advantages.

2D Wing Loading

(Traditional Wing Loading)

This is calculated by taking the weight of the plane and dividing by the wing area. A good rule of thumb is for a 40 size trainer one would expect a wing loading of about 16oz/sq ft and will be a docile flier. Let's call this a 2D wing loading in this article.

This is a planform view of the wing area which was common in the older days as everything was built from two dimensional drawing plans. Today it's unusual to have a set of plans due to the proliferation of ARFs. However, the wing area is typically located on the advertising documentation and in the manual along with the expected build weight.

This wing loading is a good reference when planes are of similar size and can be roughly used to see how it will fly and to estimate landing speed. However, this yardstick starts to fall apart if the size of the plane changes very much.

Cubic Wing Loading

(aka 3D Wing Loading)

There is another yardstick called cubic wing loading or 3D wing loading that is a metric that holds together as the plane change sizes. There is a little more math involved, but it's nice to see a figure of merit that works across the board. There have been magazine articles over the years on this topic trying to popularize the cubic wing loading which I have found to be interesting.

It's all well and good to have different yardsticks for different uses. One of the difficulties with having multiple wing loadings is that it is unusual to see the same plane scaled over a wide range of wingspan. So, it's sort of tough to compare because the plane itself is also changing.

Since I'm fond of 3D Hobby Shop planes these days, let's use them as an example. There is one model, a Slick which is a model of the full scale Slick Aircraft (www.slickaircraft.com) that is offered over a 3:1 range of wingspan, from 42" to 126" wingspans. 3DHS publishes wing area and target weights on their website so we can easily see how both types of wing loading metrics vary over the rage of aircraft sizes.

Below is a table showing both 2D and cubic wing loading across a range of 3DHS Slick models and a mid range extra. Let's consider the slick at both ends of the range and note the range over which 2D wing loading changes as compared to the 3D version. On the 2D front, the 42" slick has a 2D wing loading of 12 oz/sq ft while the 126" slick has a 2D loading 35 oz/sq ft, 3:1 wingspan, a nearly 3:1 variation in 2D wing loading.

On the cubic loading side its 7.6 vs 7.8 respectively, wow. Even though the ends of the 3D scale are a bit less than those in the middle, clearly the trend can be seen that the cubic wing loading is near constant over the same 3:1 range of wingspan. While I haven't had the opportunity myself, I have read that there are a lot of similarities between the 42" and 126" slicks regardless of the wingspan variation. Clearly the 3D wing loading was used to target the weight of this modes.

Having just maidened my 71" slick, I have to comment that many similarities exist between the 51" and 71" versions especially in landing styles. Regarding weights I'm pretty close to below with the 51" at 4lb and the 71" at about 10lb.

MODEL	SPAN	CHORD	AREA	WEIGHT	WING LOAD	WING CUBE
	INCHES	INCHES	SQ INCHES	OZ.	OZ/SQ FT	LOAD
3DHS slick 42	42		375	32	12.29	7.61
3DHS slick 51	51		525	62	17.01	8.91
3DHS slick 70	70		950	152	23.04	8.97
3DHS Extra 330SC	72		1000	160	23.04	8.74
3DHS slick 89	89		1500	288	27.65	8.57
3DHS slick 126	126		2900	704	34.96	7.79

Wing Loading Comparison, 3DHS Slicks and an Extra

Following is another table of a wider range of aircraft with similar calculations from a spreadsheet I found on the web. While I might not always agree with the subjective categorization as “gentle” and “nice flying”, it does serve a purpose of categorizing many aircraft in a relative way and certainly the relative classes are ranked appropriately. Some of the models might be familiar. If you have some of these aircraft and have flown them, you might have first-hand experience on how the plane feels; if it’s heavy, trainer like, etc. I try to relate how the plane feels to the cubic wing loading column on the far right. Doing this you can start to develop an intuitive view of otherwise unfamiliar aircraft before even touching them or shelling out the cash.

It seems this table was developed from mostly non electric types but that’s ok, most of us came from that space anyway. Also note that within a range of aircraft there is some variation in wingspan, some as much as 2:1 or more. I added my Electrostik to the table where it seemed to fit regarding cubic wing loading and it shows up in the “Gentle Planes” section; I would have to agree it is a gentle flying plane and very forgiving especially considering the original CG placement and how far I moved it before even approaching the Neutral Point as described in a previous article on Trimming with CG Placement.

MODEL	SPAN	CHORD	AREA	WEIGHT	WING LOAD	WING CUBE
	INCHES	INCHES	SQ INCHES	OZ.	OZ/SQ FT	LOAD
			THE "GENTLE" PLANES			
SIG KADET SENIOR .40	62		1150	96	12.02	4.25
SIG KADET SENIORITA .25	63		746	60	11.58	5.09
Grt Planes Fokker Triplane ARF	180 total		1367	160	16.85	5.47
GP U-Can-Do 3D .40 ARF	56.75		904	88	14.02	5.59
GP U-Can-Do 3D .60 ARF	65		1024	124	17.44	6.54
HORIZON HOBBY FUNTANA	56		714	80	16.13	7.25
Revlution Q500	50	10	500	56	16.13	8.66
electrostik	51	11.5	586.5	60	14.73	7.30
			THE NICE FLYING PLANES			
SIG SOMETHIN' EXTRA	51.5		614	72	16.89	8.18
GP RYAN STA	82		1066	165	22.29	8.19
Dymond REARWIN ARF	100		1600	312	28.08	8.42
SIG ASTRO HOG	71		824	116	20.27	8.47
SIG SKYBLT	102		798	112	20.21	8.59
SIG SMITH MINIPLANE	84.5	8	676	88	18.75	8.65
SIG 4 STAR 40	47		604	76	18.12	8.85
GP Giant 300L kit	100.5		1670	352	30.35	8.91
SIG 4 STAR 60	70	13.5	945	150	22.86	8.92
J3 CUB (World Models ARF)	72	10	720	100	20.00	8.94
GP DAZZLER .40	48		578	72	17.94	8.95
HOBBICO AVISTAR 40	59.5		602	80	19.14	9.36
GOLDBERG ULTIMATE BIPLANE	107		980	168	24.69	9.46
GP PT-40 TRAINER	60		515	64	17.90	9.46
			GETTING MORE ADVANCED			
Pica Spitfire .60 kit	65		714	112	22.59	10.14
GP Extra 300S .60 kit/ARF	64		744	120	23.23	10.22
SIG SPACEWALKER II /G23	13.5	84	1134	232	29.46	10.50
SIG 300 XS ARF	74		990	200	29.09	11.09
F20 TIGERSHARK	47		535	80	21.53	11.17
GP P51 Mustang Kit	57		580	96	23.83	11.88

Lightly loaded planes

MODEL	SPAN	CHORD	AREA	WEIGHT	WING LOAD	WING CUBE
	INCHES	INCHES	SQ INCHES	OZ.	OZ/SQ FT	LOAD
			GETTING MORE ADVANCED			
Pica Spitfire .60 kit	65		714	112	22.59	10.14
GP Extra 300S .60 kit/ARF	64		744	120	23.23	10.22
SIG SPACEWALKER II /G23	13.5	84	1134	232	29.46	10.50
SIG 300 XS ARF	74		990	200	29.09	11.09
F20 TIGERSHARK	47		535	80	21.53	11.17
GP P51 Mustang Kit	57		580	96	23.83	11.88
			THE HEAVY IRON			
Top Flight Gold P51	65		734	144	28.25	12.51
GP 40 Spitfire kit	55		526	88	24.09	12.61
Top Flite Gold P47 Thunderbolt	63		713	144	29.08	13.07
Top Flite Gold Corsair	62		700	144	29.62	13.44
AT6 (Great Planes .40 ARF)	60		558	104	26.84	13.63
			THE LEAD SLEDS!!!!!!!!!			
Top Flite Gold Spitfire	63		687	154	32.28	14.78
Top Flite Gold P40	54		697	160	33.06	15.03
SNJ (Top Flite Gold AT6)	69.4		713	168	33.93	15.25

More heavily loaded planes

The original excel spreadsheet is posted on the EBRC website at the following link (thanks Chris!). If you have Microsoft Excel, just download the spreadsheet and you can plug in your own model parameters and the 2D and cubic loading will be calculated for you.

http://www.eastbayrc.org/articles/Model_Flight_Performance_Chart.xls
(Note: Link no longer works)

There is a section on Ritewing that you can over write, or just highlight the line and insert a new line that you can populate. If you have trouble, drop me an email and I'll be glad to help.

WING LOADING (2D)

Some Additional Calculators

http://www.ef-uk.net/data/wcl.htm

More details

Below are the specific calculations done in the spreadsheet. You can do them by hand with a scientific calculator or on any computer with the built in calculator placed in scientific notation. Or you can just use the spreadsheet.

= Weight(oz)*144/Wing Area(sq in)

= Weight(oz) / Wing Area(sq ft)

WING CUBIC LOADING

= Weight(oz)/Wing Loading ^ 1.5

Note: Wing Loading ^ 1.5

= Wing Loading * sqrt (Wing Loading)

where sqrt is the square root.

MEETING MINUTES FROM JUNE

Old business

- The agreement with the Park is still being pursued. The State is claiming that we need to carry some type of insurance. The reason it is some type it due to the states inability to tell us exactly what they want. John has been working this constantly and the power that be on the State side have not been able to explain the requirements. We all thought of Mark Weiss and getting his expertise on this since the State cannot explain to us. More to come

- FPV incident or not: The recent claim that someone flew an FPV vehicle within proximity out of the park towards the airport. Fred has asked a couple of people to get a feel, but nothing has come up on this. At the end of the day, line of sight is the key word for all. Roger put out all the guide lines that will keep us out of trouble.

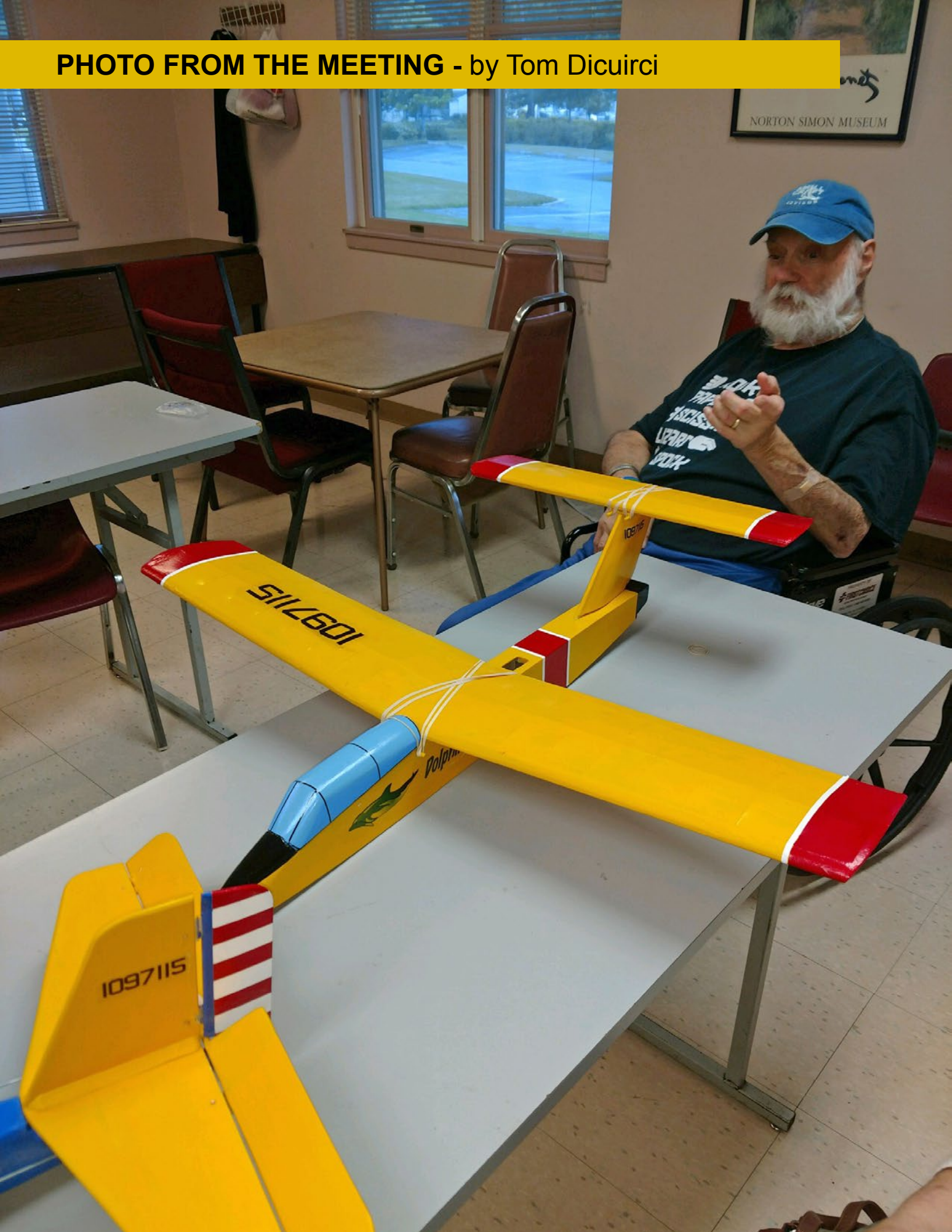
- Gate to the field: For security measures and to keep our field nice, the gate should be kept close unless someone is flying. If you are the last one out, close it. If someone is there that does not belong, call the park range and get help. Usually once told, if people are visiting, they will leave if asked.

- Currently there are 45 members that are not paid. Please pay your dues. Our membership lost is very accurate now.

- Dates to remember:
    - Heli's over Delaware June 29 thru 1st of July
    - IMAAC July 28 thru 29
    - WOB July 11 thru 14
    - Club picnic 2 September
- Paul Esterle came with some of his projects and showed his craftmanship off. Great work, three planes on the table and a brief description on his adventures to build them. Thanks for sharing Paul

- One last item. There is a new hobby shop opening. Its in Peoples Plaza. Can't wait to see what they carry.

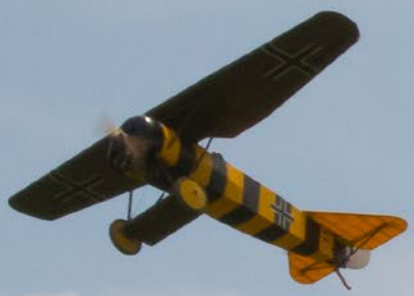
PHOTO FROM THE MEETING - by Tom Dicuirci



WARBIRDS OVER DELAWARE

Did you know that this will be the 27th year the Delaware R/C Club has hosted Warbirds Over Delaware? It is not only the club's biggest event of the year, it is also the premier event of it's kind in our region. Not only do as many as 200 pilots come from all over to fly their amazing giant scale models in the event, close to 5000 spectators come to see the planes fly. As impressive as these facts are, they are only part of the story.

Warbirds Over Delaware (WOD) is about friends. Many of our pilots come year after year after year. They come to the event to connect with old friends that they only get to see at WOD. They also come to meet new people, to exchange hangar stories, give and receive tips, buy and sell models, and yes fly. After all, how many times do any of us get to show off our model and flying skill in front of a thousand people or more? How often do you get the chance to fly your plane in the pattern with two or three dozen others?

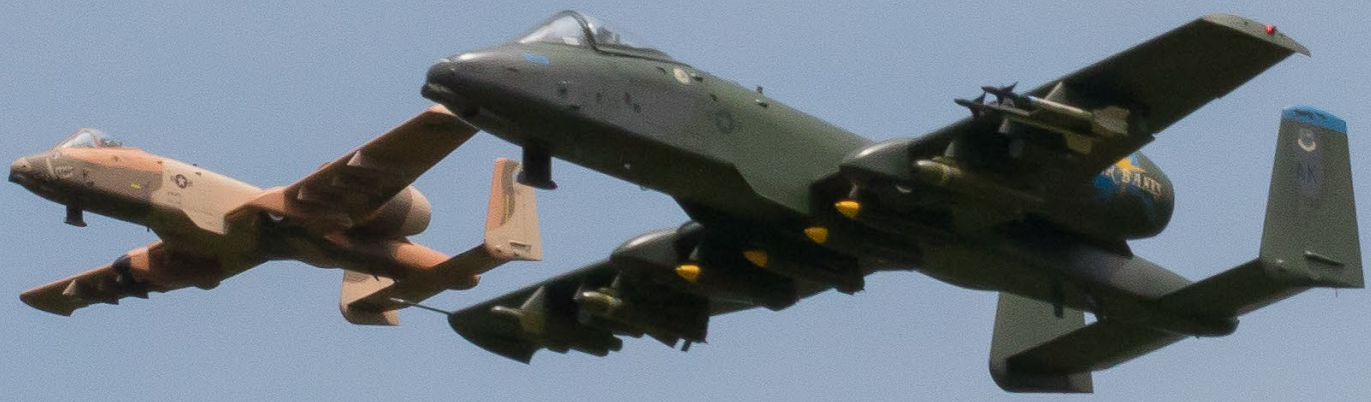


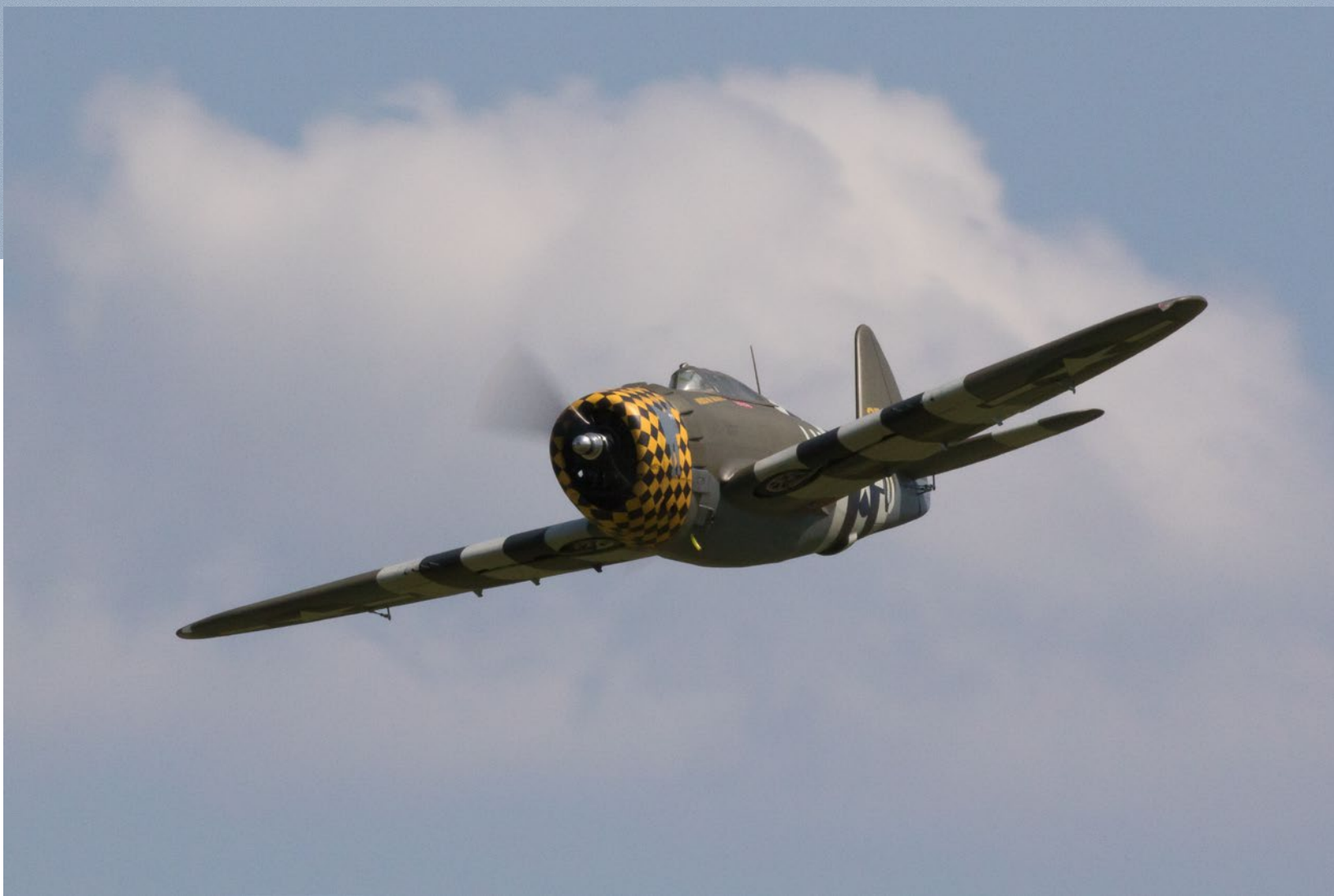
Any time so many planes fly, problems develop. This is when pilot skill comes into play. Gracefully landing a giant scale warbird with only one wheel, or no wheels down is a heart stopping challenge. As is trying to land a 50 pound airplane dead stick. In the years I have worked at WOD, I have seen some amazing saves. It is impressive to hear the cheers when someone pulls off a great save.

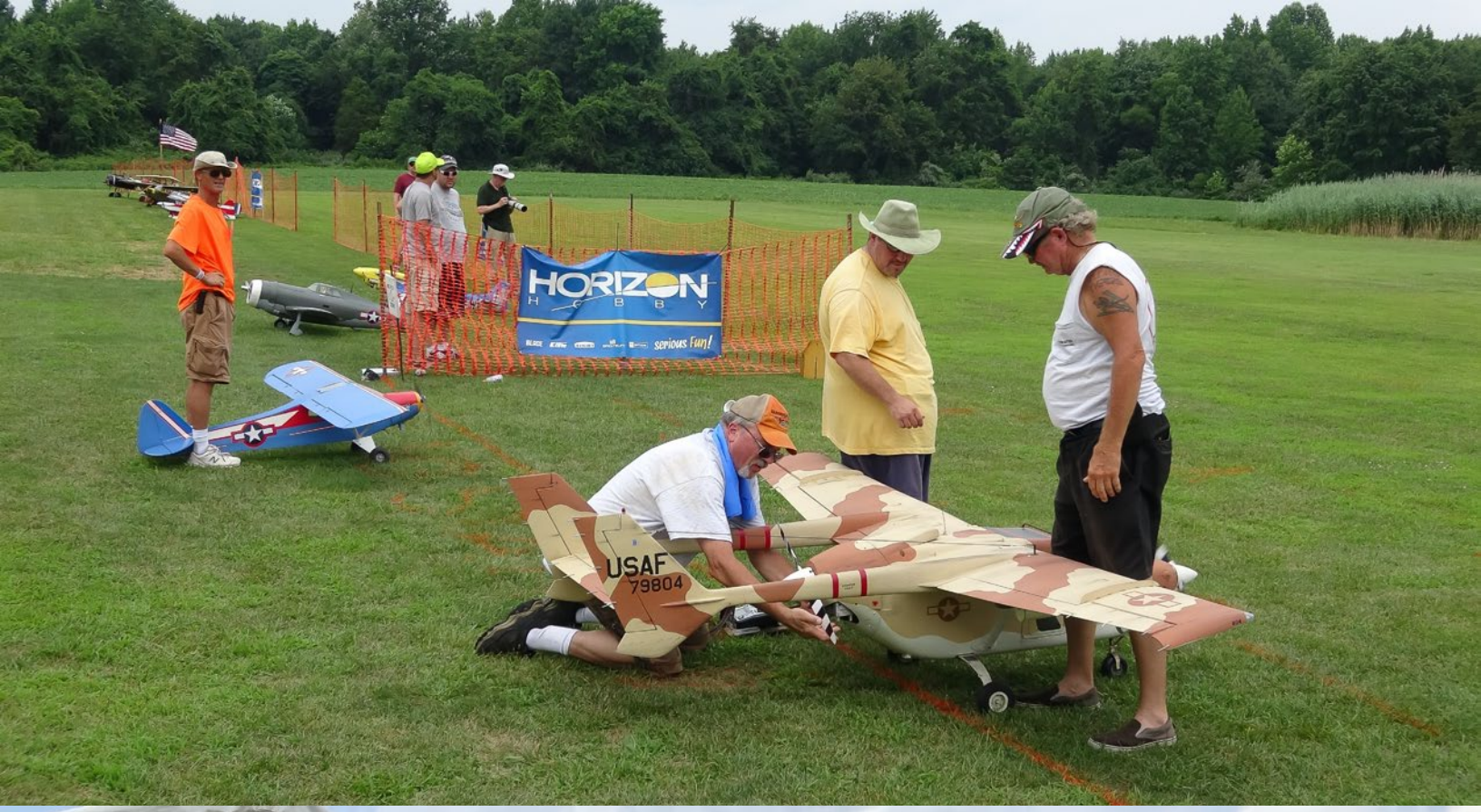
Another test of pilot skill comes when some of the pilots challenge each other to do the lowest HIGH SPEED pass of the field. Adam Lilly has the record so far. The prop of his plane actually made contact with the ground. Not till he landed and he saw his splintered prop did any of us realize just how hard he hit. Adam is not alone though. Our own Mike Monack flew so low that his wing actually touched the ground (we have the photo to prove it) and he kept right on flying. Talk about skill.

If you want an adrenalin rush, fly in the WWI or WWII gaggle. The pace is fast and furious (yes, even with WWI planes). It takes a lot of concentration to keep from overtaking a slower plane, or being over taken by a faster one, from climbing into a plane above, or descending into the path of one below. The pilot has to pay attention to flying his own plane. He can't go looking around for possible trouble. That is the job of the spotter. The spotter has to provide needed information clearly, and in time for the pilot to take corrective action. In the gaggles this means that there has to be a constant flow of information between spotter and pilot. Not till the plane is safely in the pits can either relax. The whole experience is a real adrenalin rush.

By now, hopefully, I have peaked your interest in experiencing Warbirds Over Delaware to it's fullest. Come, visit, and take part in a truly great flying event.



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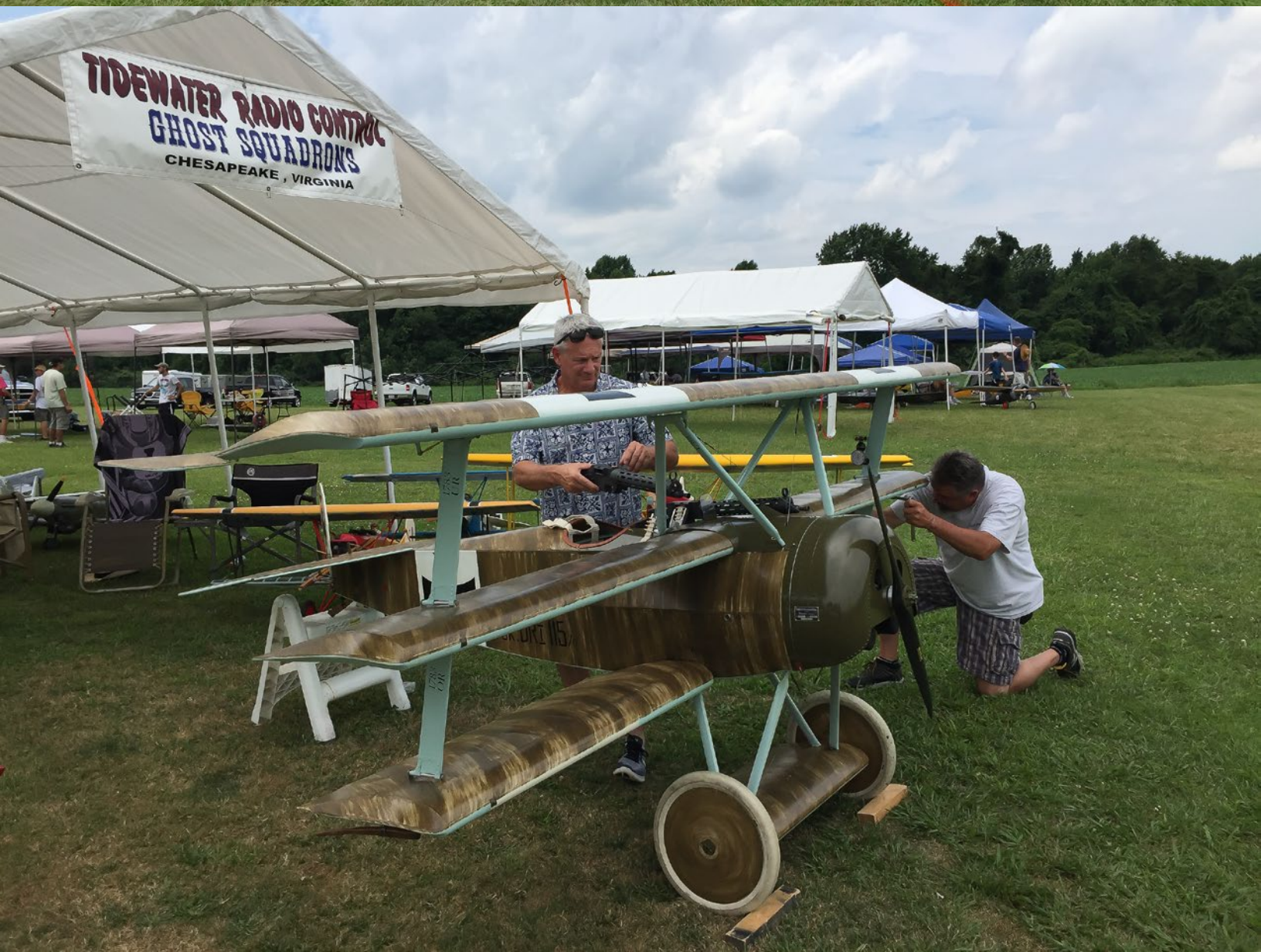
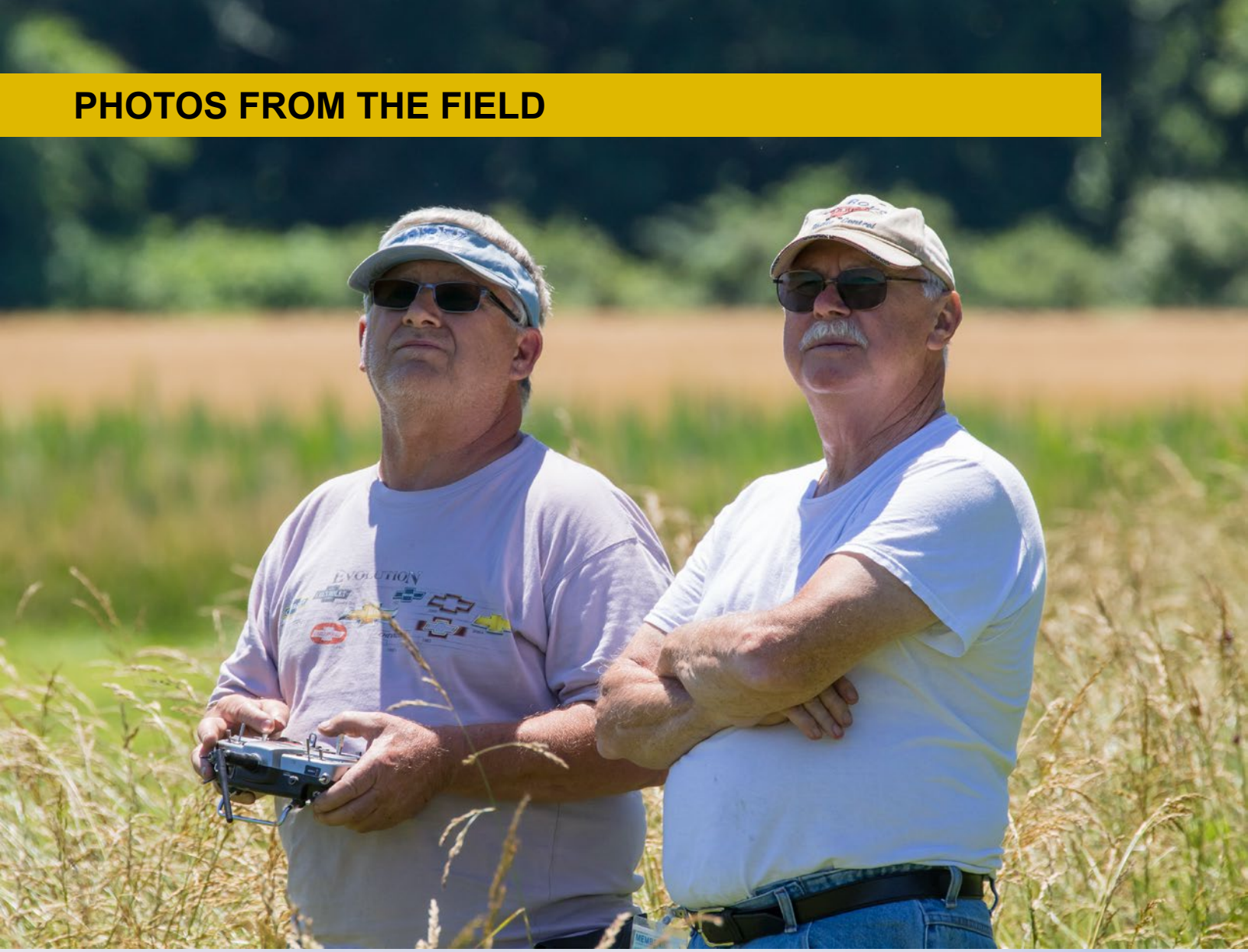
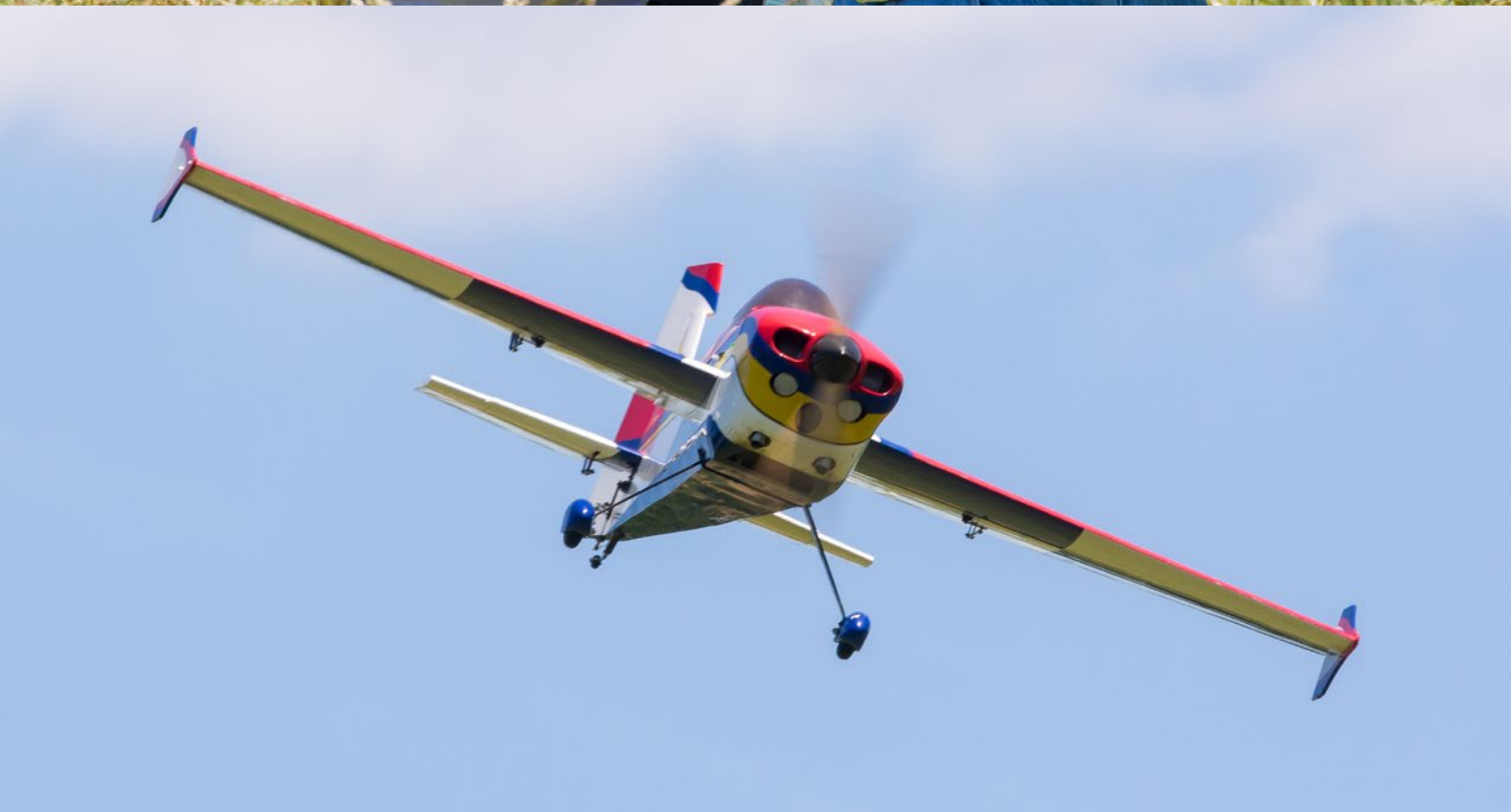
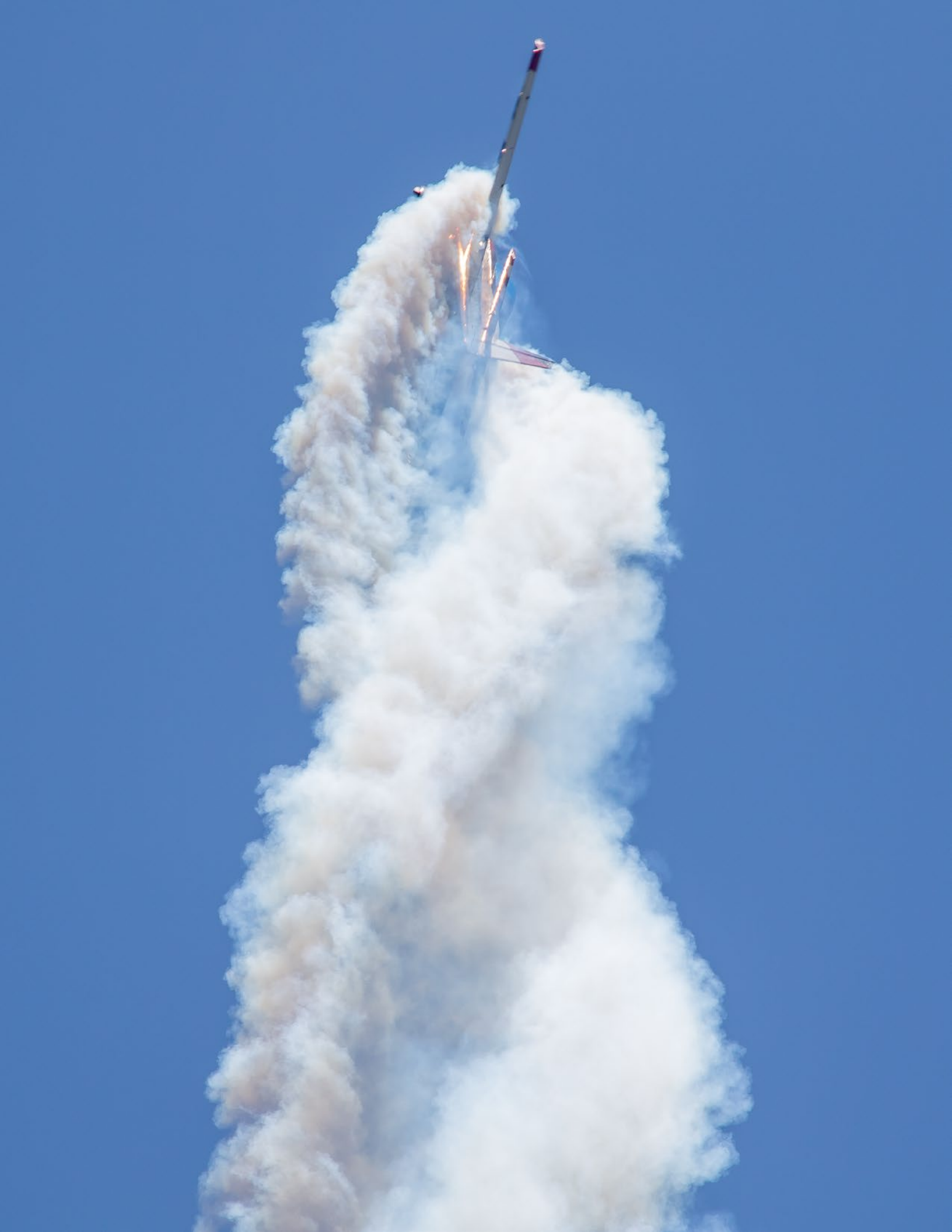
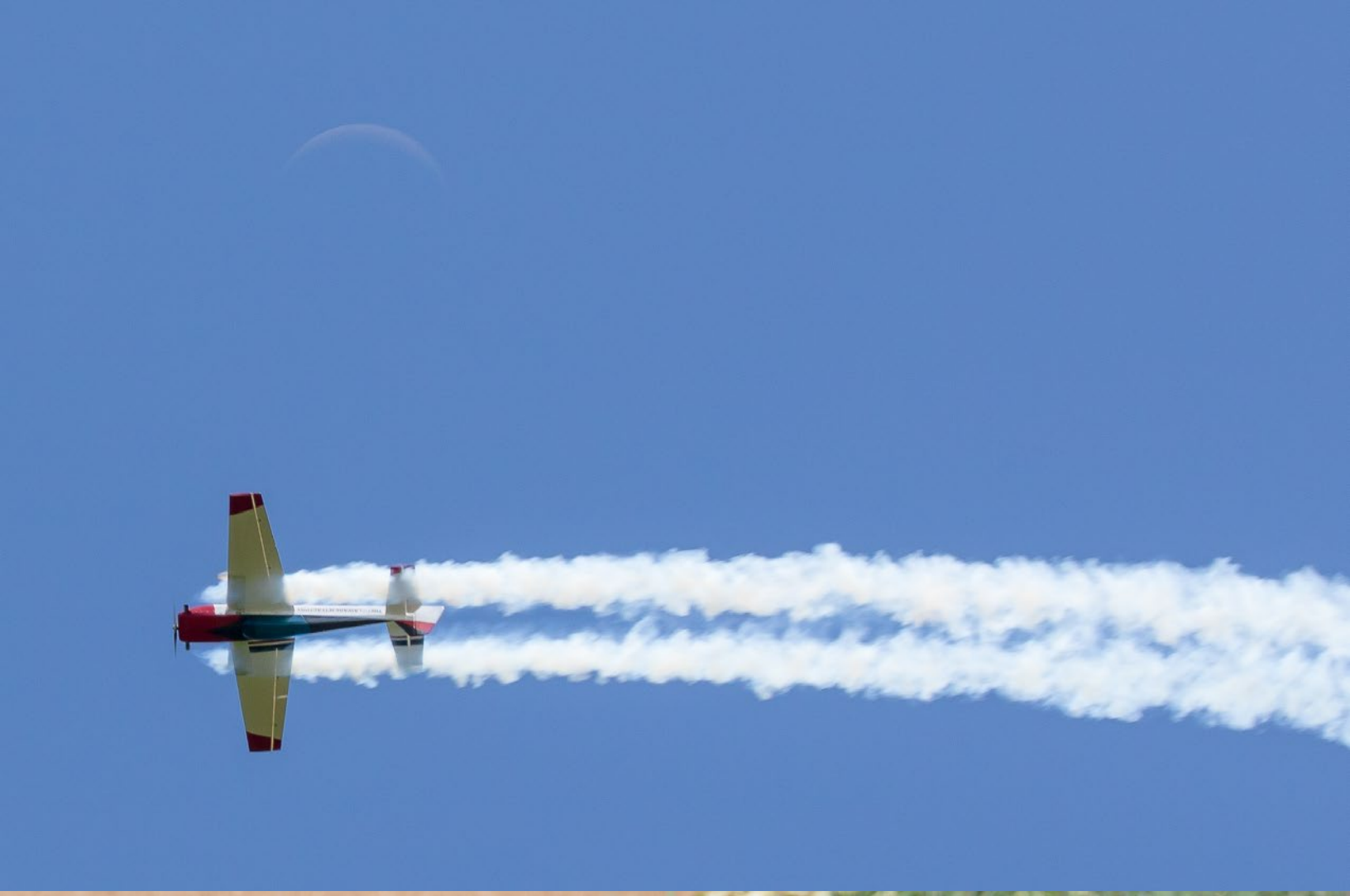

TIDEWATER RADIO CONTROL
GHOST SQUADRONS
CHESAPEAKE, VIRGINIA

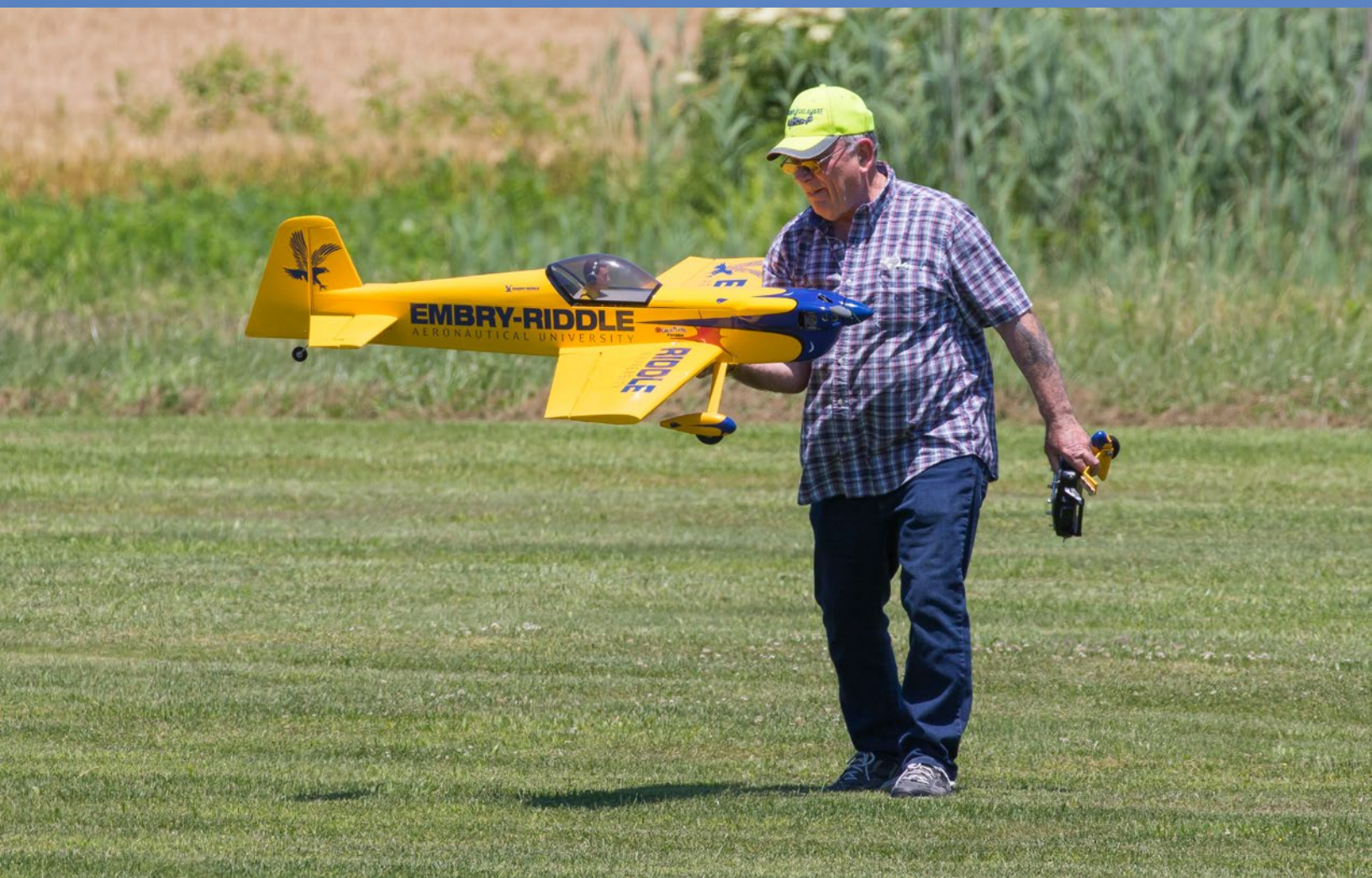
PHOTOS FROM THE FIELD







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AERONAUTICAL UNIVERSITY
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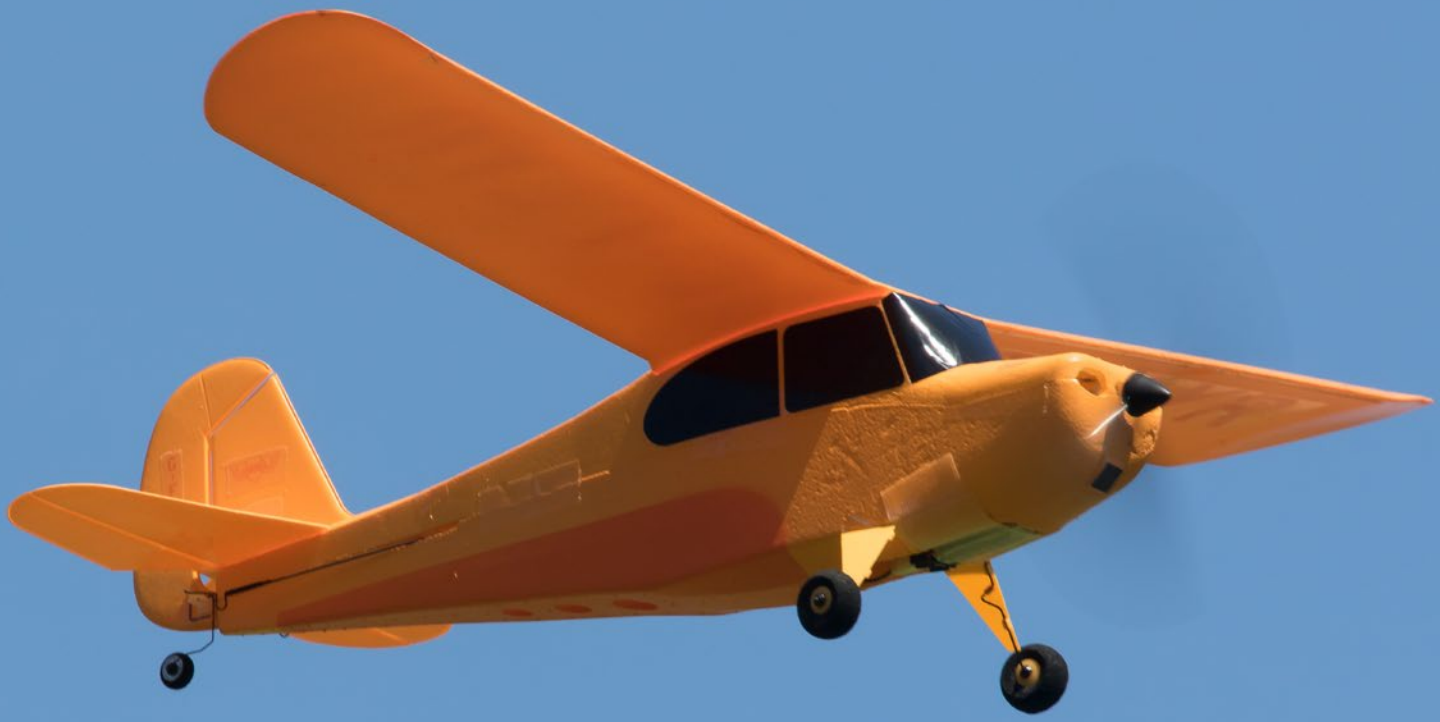
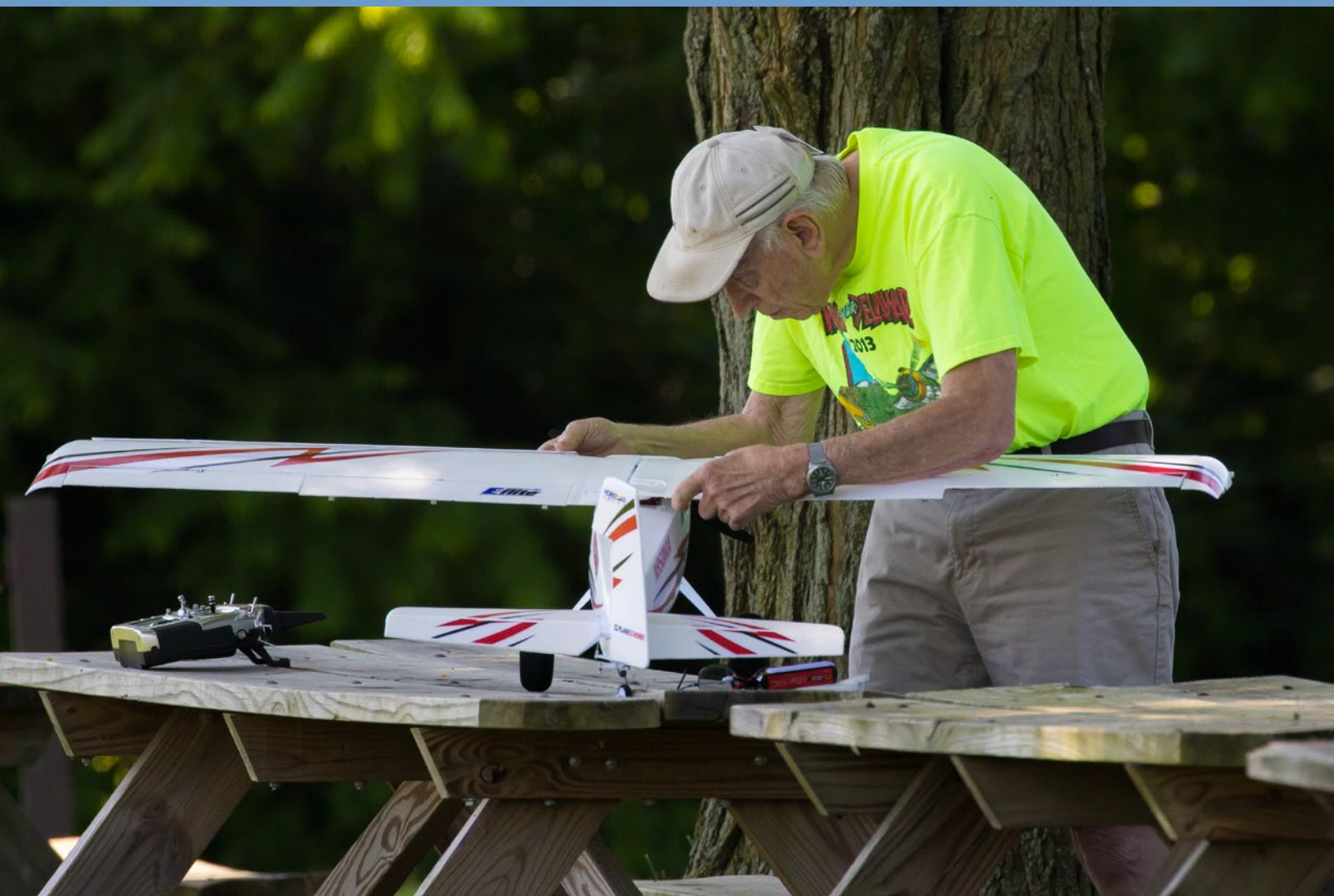
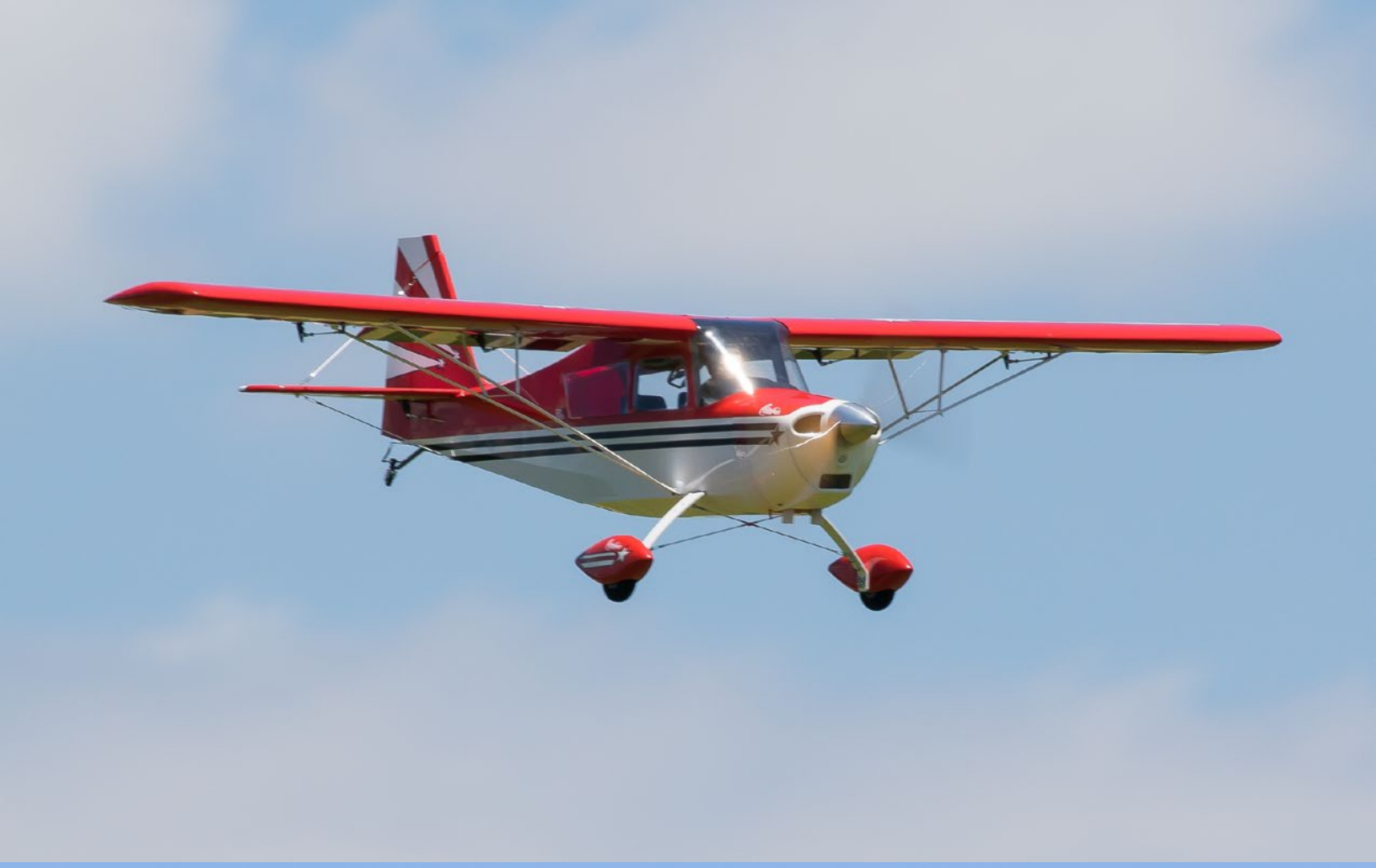
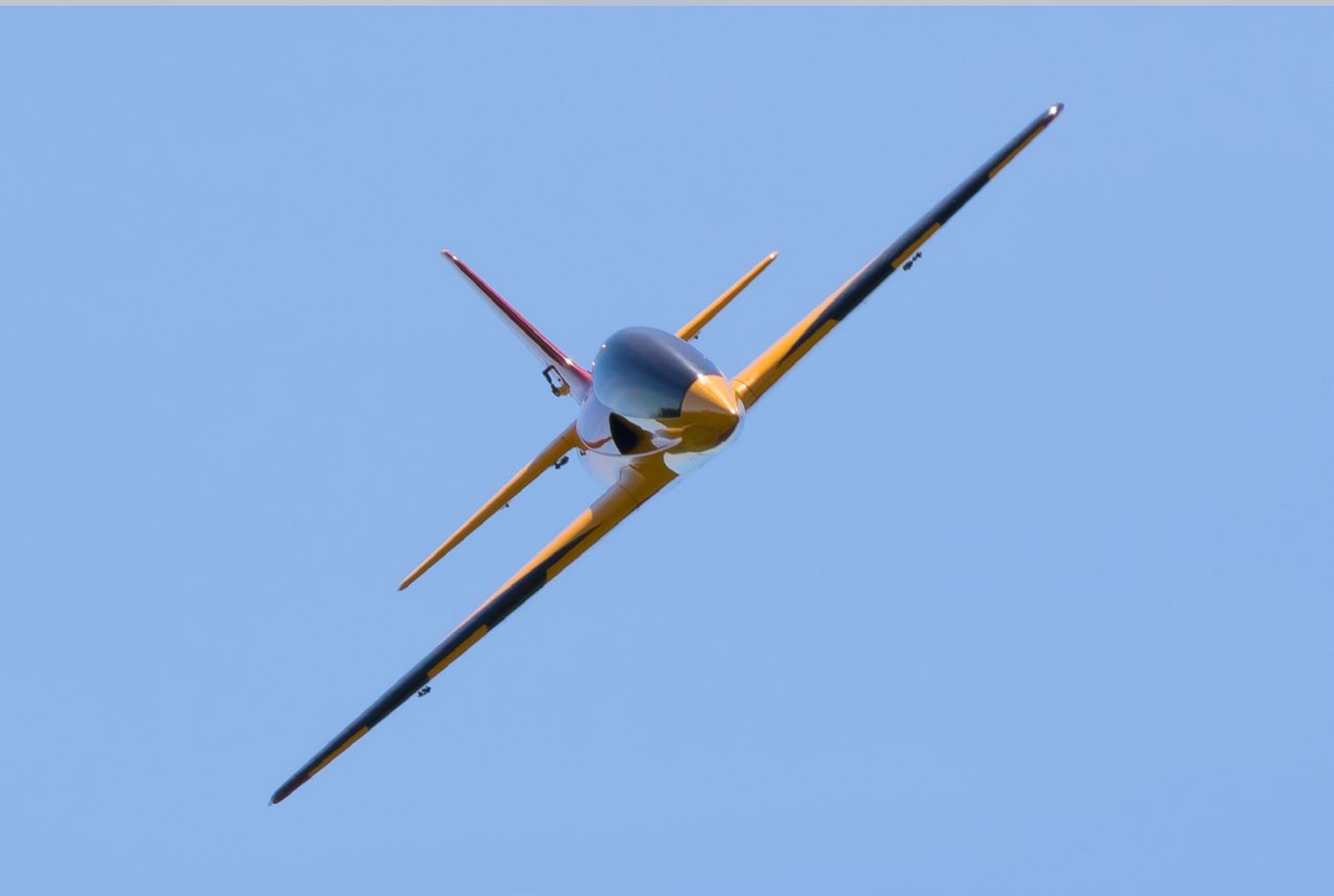




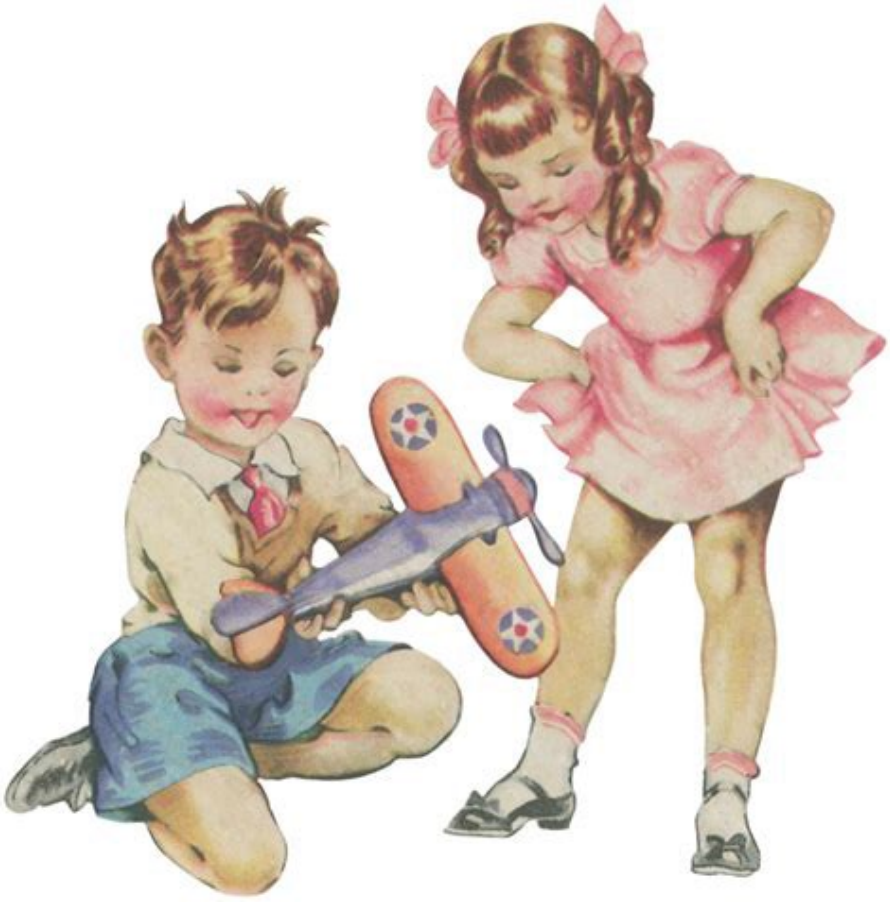




2018 Aerorama

Radio Control Model

AIR SHOW



Tuscarora State Park-Barnesville,

www.tuscarorarcflyingclub.com

Glitch Busters
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www.delawarerc.org

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