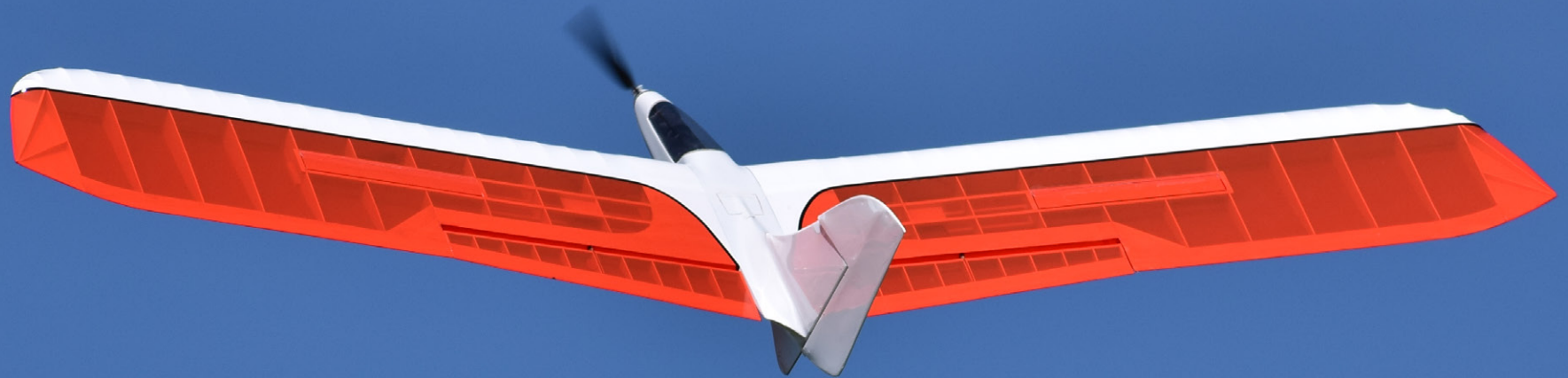


Radio Controlled
SoaringDigest

September 2017

Vol. 34, No. 9



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Front cover: Ken Bates' e-power Windlord climbs out at Wood Crafters 2017. The Windlord spans 100 inches and was designed for Standard Class competition. The construction article appeared in the March 1978 Model Aviation and plans are still available through the AMA Plan Service.

Photo by Joe Sampietro.

Nikon D5300, ISO 100, 1/2000 sec., f5.6, 135mm

4 100 Days at Torrey Pines

Will Bushnell relates his experiences moving to and flying at the premier California slope site. This is the first part of a two-part series.

15 Wood Crafters 2017

This annual reunion was held June 3-4 and featured e-power and non-powered RC sailplanes of a wide range of eras. Text by Ray Hayes with photos by Perry S. Bell, Scott Black, Tom Davies, Steve Merrill, and Joe Sampietro.

67 On the Hills of Ranà

Elia Passerini takes *RCSD* readers to a beautiful soaring site in the Czech Republic where a large number of classic full size vintage sailplanes were on display and flown. All photos by Elia Passerini.

Science mimics nature; researchers test AI-controlled soaring machine

103

<<https://news.microsoft.com/features/science-mimics-nature-microsoft-researchers-test-ai-controlled-soaring-machine/>> By Allison Linn a senior writer at Microsoft, with photos and video by John Brecher for Microsoft.

Catch-and-release sloping

111

Philip Randolph travels via the Washington State Ferry System to Whidbey Island where he experiences the classic fisherman motto in multiple dimensions.

FrSky G-RX8

116

This 8-channel receiver with built-in variometer is specifically designed for use in RC sailplanes.

Martin Simons' Sailplanes volumes available again!

117

Three books covering 1920-1945, 1945-1965, and 1965-2000 are once again in print and Paul Remde of Cumulus Soaring has them all in stock.

R/C Soaring Digest

September 2017

Volume 34 Number 9

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In the Air

There is one thing you can say about *RC Soaring Digest*, and that is the number of pages in an issue can vary from month to month. As editors, we are always seeking material for the next edition, and it is a bit disheartening to pass the deadline for submissions and get the feeling we are not fulfilling the desires and expectations of the *RCSD* audience. Not so this month!

This issue is filled with photos of both models and full size sailplanes thanks to Ray Hayes and Elia Passerini. Our sincere thanks to Perry S. Bell, Scott Black, Tom Davies, Steve Merrill, and Joe Sampietro for providing the photos for the Wood Crafters 2017 article. In all, the five photographers provided more than 400 photos! We've hopefully chosen the best from this plethora of images and presented them in an enticing way.

This edition also includes a somewhat technical article from Microsoft describing the commercial research into autonomous soaring, a feature on the new receiver from FrSky which has a built-in variometer, an overview of the three "Sailplanes" volumes authored by Martin Simons written by Paul Remde of Cumulus Soaring, and another of Philip Randolph's amusing and intriguing travelogues.

At 118 pages and with such a wide range of subject matter there's sure to be something for everyone.

Curtis Suter provided another of his cloud photos for the Contents page this month. This image was captured over White Sulphur Springs, Montana.

Time to build another sailplane!

100 DAYS AT TORREY PINES

Will Bushnell. will.bushnell@gmail.com

***“Do you know of anyone willing to go to San Diego for six to nine months?”
Email from my boss.***

“Me!” My immediate reply.

So began a slope soaring adventure of a lifetime. I had been flying RC sailplanes since 1978 and though I had done some sloping it had never been enough. Right after sending the reply I Googled the biotech where I would be working and saw it was two miles inland from Torrey Pines!

This all started in March 2014, by May I was in an apartment in La Jolla Shores, three miles from the Torrey Pines (TP) Gliderport. Six to nine months was extended to one year. The company paid to move some household goods which included a large, coffin sized, plywood box full of sailplanes. I was very busy with my new job and used most of May

to get up to speed but also, while my planes were in transit, to get “legal” at Torrey Pines.

Getting “legal” included joining the Torrey Pines Gliders, signing the 11 page release form at the TP Gliderport (and paying \$150 for the last half of the year). The Gliderport now requires a videotaped legal release and the price has gone up to \$200, the daily fee is \$10.

The next important step was getting in touch with the TP Gliders check pilots to be cleared to fly without supervision. Marty Dine was the club president at the time and bent over backwards to make sure I got set up to fly, thanks Marty. Bill Eckles, the membership chairman also worked hard to make sure I got connected. It took till the end of May when it all came together: me, glider, west wind, Bill Eckles.



The warning sign for spectators as you approach the Torrey Pines Gliderport and RC launch area.



The author's glider box



Crowded sky, looking south towards La Jolla.

I took my venerable Tragi 705X with a set of brass slugs, for light air my Pike Perfect ET, my Firebird (think Sunbird), Alula and Weasel. While I was in SD I built a Willow, an F3F plane. I also took an electric fuse for the Pike but never used it.

At Last

Aw, that first flight, it finally came together on 30 May: planes arrived from back East, nice west wind, and Bill Eckles present to help with my check flight. I wasn't particularly worried about my ability to fly from the big beautiful cliff - I was worried about the air traffic - avoiding paragliders and hang gliders. I got Bill to throw out for me and it was great! I was really flying at Torrey Pines! The flight went fine, Bill talked me around the PGs, did some light aerobatics, and enjoyed finally getting to fly at TP.

Time to land - at Torrey you walk away from the cliff up to the top of a small hill and land in the horizontal, smooth air - piece of cake. I was in! Legal to fly at TP! Thanks Bill, you made it so easy for me.

Phil Davy tour of Torrey Pines

Let's take a break from my story, instead of me describing the cliffs at TP you can get a tour from an expert, Phil Davy. Phil is a flyer of unusual skill both as a pilot and videographer. The link is to 17 minutes of end to end innovative, freestyle flying.

<<<https://vimeo.com/151895168>>>

[Reference: RCGroups, Sailplanes, Multi Task F3X, Flying "X" TREME, #152]



Waiting with Shelby the Border Collie.



A cool RC paraglider.

Blue Sky Rule

Maybe the most important skill for TP flyers is the use of the blue sky rule (BSR). This simple collision avoidance method is what makes the co-existence of RCs, paragliders (PG) and hang gliders (HG) possible and safe. Simply put, if you never allow the image of your glider to intersect the image of a PG, HG or other RC then you can't possibly have a collision.

You show up at TP on a good day with 20 PGs, a few HGs and a handful

of RCs, together with your flying skill and familiarity with the BSR you can confidently launch into that busy sky.

Only it didn't start that way for me; if more than three PGs are airborne I would be freaking - ready to dive into the cliff to avoid running into anyone. At first I would avoid weekends altogether; or, if I did attempt to fly, I'd go early as the lift started. I'd hurriedly get some good airtime then, as the sky got crowded, I'd take a break, cool breeze it, and watch the local experts (there are lots of them).

Finally I gained the experience of flying in this environment, and the realization that a good performing sailplane has many options to play the BSR game: out climbing, out running, out turning, diving and zooming way out over the ocean.

With time, I did finally get to the point when I could view that very busy sky as a challenging game that I could actually play.

Most of my early experience at TP was in light summer conditions where the lift zone was comparatively small



Craig Hanson and his Windfree.



The living room.

- compared to stronger conditions. As conditions grow stronger the lift band expands up and out, making separation easier to maintain and finding an empty chunk of air to play in is much easier. With stronger conditions the PGs (with a lower speed range) are forced to land and the sky gets less crowded leaving the RCs and HGs airborne. With even still stronger conditions the RCs (with lots of ballast) finally have the place to themselves – that’s a magic hour with lots of screaming carbon!

My Home Life

Being pulled out of my east coast life (four bedroom colonial, wife, three kids, two dogs) to an apartment (company paid) in La Jolla Shores with an ocean view with nothing to do other than work and fly was, to be honest, quite a treat for me. Was I lonely? F### no, I wasn’t lonely! I had lots of family and friends come visit, but most of the time it was work and fly, work and fly.

In the morning I would go to my car with my backpack and a glider bag.

If I hadn’t flown that day I’d leave the glider in the car for the next day (had underground parking). I’ve included a photo of my living room where, in the absence of visitors, I kept my gliders.

Sailplane building and maintenance in an apartment took some adjustment. I built a Willow on the dining room table, used the top of the toilet tank as a soldering surface. I got a big poster from work so I could convert the walk-in shower into paint booth. Transmitters and chargers littered the place.



Photo shot at the Willow maiden..



Look! It's Phil Davy.

Basically, it was what I'd imagine heaven would look like.

My location couldn't more ideal. TP was midway between work and home. I drove by the entrance to the Gliderport at TP Scenic Drive to and from work. If I saw PGs in the air I knew I'd be flying.

I could never get over my impatience to get in the air, and invariably got stuck behind people looking for a parking spot, just driving slow, or walking in my way.

I had to get in the air!

The Goal

I had been flying a couple of months at TP and it occurred to me that, with some luck, I could fly at Torrey Pines for 100 days during my one-year assignment. All I had to do was fly on average a little over eight days a month. But, I didn't consider the SD weather could actually be uncooperative, work demands (that's why I was there), family visits, and trips back east for holidays. I tracked my flying days on my iPhone Notes app and, as it turns out, I got to be a bit obsessed.

My rule for counting a "flying day" was simple: a day with at least one "soaring flight" qualified in the count. A single day could only be counted once. On several occasions I had more than one flying session in a single day; for example, a lunch session then an "on the way home from work" session – and I would count this as one flying day. A few times on a light day I would throw out from the hump and make a pass, if lift was too light I would glide back and land at the cliff's edge. In this case, that effort



Random shot from one of the many TP Gulls Fly-ins, note the wide range of gliders, foamy, built up and molded.



Schweizer Fly-In.

wouldn't count since it wasn't a "soaring" flight. I recall my shortest flight that counted was ten minutes of scratching. Usually on a weekday I'd be satisfied if I got an hour airtime. On weekends available airtime was much longer but I never tracked my total airtime.

The Beach

When my boss asked if I knew anybody willing to go to SD I didn't check with my wife because I knew she would happily spend her life sunning on a beach. We lived within walking distance of the beach

at La Jolla Shores, an easy sell. We would both go to the beach on weekend mornings, and from that beach I could see the launch at the Gliderport. I would keep an eye on the launch, once I saw PGs in the air I'd quickly ask: "you don't mind if I....". She never did mind, as long as she was on the beach.

Spectators and crowd control

The TP Gliderport is located in a State Reserve, near a major university, a large destination city and borders a large beach parking lot. Not only are there lots

of people who come and watch PGs and HGs (to a lesser degree RCs), but lots of people just stumble onto the Gliderport. There are no physical barriers to separate RC pilots and spectators, so while calmly enjoying a flight you may find yourself surrounded by a family from Iowa asking how to get to the beach - and by the way "does it have a motor?" and "How does it stay up?"

The lack of physical barriers has a more serious implication for the PGs and HGs; spectators and passersby can wander



Firebird after a zesty session.



It's been windy.

knowingly or not across the PG/HG launch and landing area and could create a dangerous situation. That's where the RC pilots intervene: if a spectator is walking along the cliff edge and about to enter the PG launch/landing area it is expected that we warn them. "Sir would you please walk back this way and use the path to cross the Gliderport," or something like that.

You learn to do this while you are flying. Some people are glad to have the warning, but some don't want to be told

where to walk so they continue on only to be yelled at by the Gliderport guys/gals.

All in all though, the interactions with the people who flow through the Gliderport do make for a more interesting experience.

I met some very interesting people from all over the world right there at the RC launch. My favorite conversations were with the HG pioneers who come through for old times' sake, even met some full scale sailplane guys from the 50s.

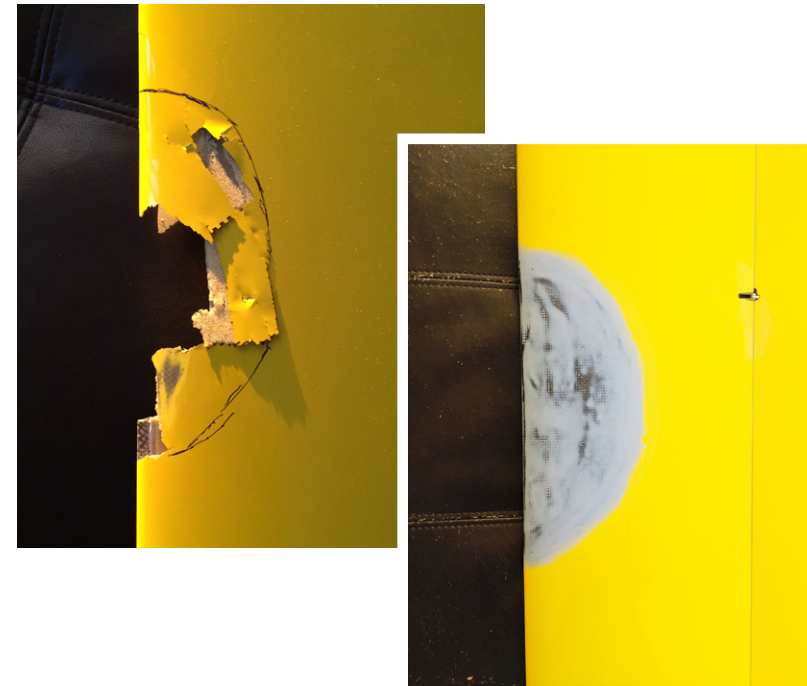
Rule 1 and Rule 2

The designated/protected RC sailplane area is just north of the PG/HG launch area, going from launch to a large flag 200m to the north. When PGs or HGs fly into that "window" they are supposed to blow a whistle to make their presence known. I'll refer to it as Rule #1 because it is the first and most popular rule to be ignored.

Since one can't rely on this signal you have to make yourself aware of incoming traffic - constantly.



Playing hooky with the Tragi.



Ouch! That windsock pole! But a relatively easy repair.

Rule #2 states that only one PG or HG can be in the window at one time.

You guessed it, this is the second most popular rule to be broken, and I've counted five PGs in the window on a busy day. All in all though, I don't really blame them and it never really bothered me that much. Some guys would yell "how about a whistle" although it never seemed to help.

How good is it?

So how enjoyable is it to fly at a big coastal site like TP?

Let me answer with a memorable story.

The winds were light one evening as the sun was going down, and getting too light for the PGs to stay aloft, and there were no other RCers. SD slopers don't call in sick for an 8 mph west wind - I had the place to myself.

Since the wind was light I was flying my Pike Perfect ET.

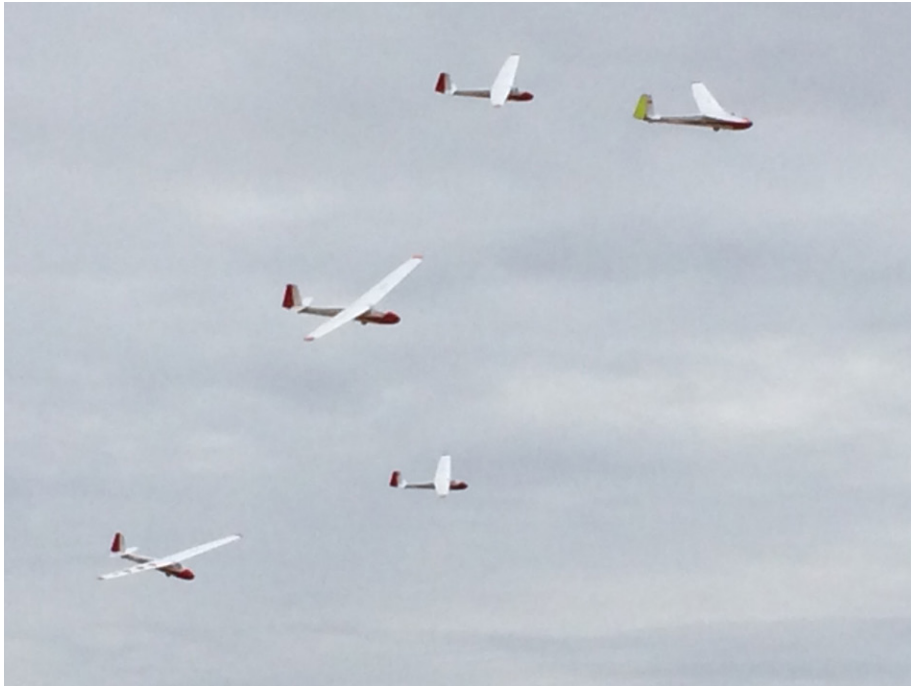
I walked down to the cliff edge as it was getting dark and was flying passes out over the cliff drifting back in big circles,

knowing that at some point the lift was going to stop, just ghosting around.

I decided to catch the Pike and the first pass was a little too cross, so I flew further over the glider port going further back to clear the windsock pole. BAMM! Only I didn't clear it... Damn!

I walked up to see the damage and the leading edge of the center panel was crumpled back to the spar.

Even with a bashed LE it remains one of my most memorable flights at TP.



A flock of Kates.

*On any given day
you run into some
nice gliders - Pike,
Fosa Lift, the
mighty Skywalker,
a carbon 2M and a
collection of Katos.*



The Kate

The Parkzone Ka-8 is a 2.3m foamy scale model of the Schleicher Ka-8, the classic fabric covered sailplane of the 50s. When I first saw someone with the Parkzone version, my thought was "What a goofy little airplane." But I have been wrong before, for example - "Music and a camera on a cell phone, that's so stupid". I was equally wrong about the venerable Ka-8, or the Kate as it's called. With the right CG it is very aerobatic, has a decent speed range, and turned

out to be very popular. (07) At one TP Foamy Fly In there were nine in the air at one time, enough to confuse at least one pilot to fly the wrong plane. The photos I've included were from a Fly In at Dave's Beach. Ian Cummings (my friend, professional photographer and TPG VP) took some amazing video at a TP Foamy Fly-in in 2015, this from his Kate and his innovative turn-clearing pilot. I dare you to watch this video without smiling.

<< <https://vimeo.com/128071731> >>

[Reference: RCGroups, Sailplanes, Slope, San Diego Sloping!!!, #17145]

Oh Shelby

A description of TP isn't complete without some mention of Shelby. Shelby is a Border Collie who belongs to the Gliderport operator. She doesn't really seem to care who she belongs to, she has a single minded purpose in life and that is the chase RC sailplanes. She doesn't have time for all the people who come through and want to say hello and pet the pretty dog. No, she wants to



Shelby guarding my Tragi.



Yes, a band on special weekends.

chase your glider as you throw it off the cliff. The spectators gasp as she heads for the cliff edge chasing the glider as it heads out to sea, but Shelby knows exactly when to put on the brakes. (13) (19)

I flew at TP enough that she associated my greeting with a guy who was going to throw a sailplane; she seemed to be happy to see me but I knew it had nothing to do with me. A few times on light days I would fly along parallel to the cliff edge so she could chase the glider,

other guys would give her the same treat.

A creature so obsessed with sailplanes that she doesn't seem to care about much of anything else, just the joy of seeing a glider go through the air. Sounds like me, and you!

Ray Pili

If you've flown at Torrey Pines as a guest in the last few years you likely got some assistance from Ray Pili, the Torrey Pines Gulls Slope Coordinator. I had the great pleasure of flying with Ray many times. I was always impressed by his calm and

relaxed manner and his endless energy in helping guest fliers get in the air at TP. As his role as Slope Coordinator he organizes multiple Fly-Ins every year, complete with free food and prizes. (17) In 2015, Ray was awarded the prestigious honor of Torrey Pines Gulls Modeler of the Year, a very much deserved award; true to his humble nature it was the last thing he expected.

I was there one afternoon when Ray was letting a guest pilot fly his Kate. The guy flew for quite a while when Ray ask to



Marty Dine (the big guy) and his Espada.



Sunset flight.

take the sticks for a bit. The dude's eyes were bugging out as Ray goes 3D with the Kate.

Below is a nice Phil Davy video of Ray wringing out a Carbon Spider 2.5.

<< <https://vimeo.com/148715275>>>

[Reference: RCGroups, Sailplanes, Slope, San Diego Sloping!!!, #17418]

End of Part One

During June through October of 2014 I was on track with my 8-10 flights per month schedule. Once November arrived

the days got shorter, weather got less perfect, Thanksgiving back East - I started to fall behind. December was worse. I lost 10 days due to Christmas back East. You can tell I was getting a little obsessed when I viewed holidays with family as lost time.

Anyway, by the end of December I had flown 58 days at TP.

January was even worse with only three flying days, adding to a total of 61 days overall. I was scheduled to return back East at the end of April - that gave me

three months to get 39 soaring days at TP - it wasn't looking good.

Stay tuned for Part 2, where you'll learn how it all turned out.

Sincere thanks to my friends who reviewed Part 1 and gave valuable comments: Ian Cummings, Hani Zaki and John Bitzer.



WOOD CRAFTERS

JUNE 3-4, 2017



Text by Ray Hayes, skybench@comcast.net

Photos by Perry S. Bell, Scott Black, Tom Davies,
Steve Merrill, Joe Sampietro



Tom Davies

My first Wood Crafters event was 2002 and ran consecutively thru 2008, continued in 2016 after Greg Prater held this event from 2009 thru 2015. We owe Greg a big thank you.

This year, approximately a week before the event, the weather forecasted a complete washout including Friday. Not to be, starting Friday, we had the most beautiful blue skies and slight wind conditions you could imagine. Everyone was smiling and we got our fill of RC soaring over the weekend.

Tom Boice gave a nice talk at our Saturday Night Dinner on the connectivity between us woody builders and the SAM organization events.

Why Wood Crafters? Well, building your own got started way back in the thirties with free flight models. I built my first free flight in 1941 thanks to my Uncle Lenny and the dining room table.

Many RC sailplane clubs were born due to radio control becoming available in the late sixties and early seventies. I got the LOFT club in Ft. Wayne started January 1975 after holding my first RC sailplane contest as a member of a power club

November 1974. So I'm pretty well rooted in this hobby and don't want to see it disappear.

Most sailplane clubs let the advent of the ARF run most of the woody builders off the field with hard core contests and super strong winches designed exclusively for the mouldies to launch like rockets.

My first Wood Crafters had approximately 60 entries, and we're down in the 40's now, so we have work to do and I can't do it alone.

Our reunion activities this year were a 2M E Group Launching won by Gary Neuzerling, Ray's 1.5 MiniHiStart Group Launching won by John Sager, Longest Winch Launched Flight won by Bob Robinson, 2 Minute Winched Launched Ladder won by Greg Smith, Longest Electric Powered Flight won by Ken Bates, 2 Minute Electric Launched Ladder won by Ken Bates. Congratulations to all that competed in these events.

I was hoping to get in some Fun Flying, but it didn't work out for me, I'm glad many others did enjoy this part of Wood Crafters.

I'm already planning next year's Wood Crafters Reunion. We will have the same events as above plus... a

tribute event to commemorate Dave Thornburg and his Sunbird design. This will be for Electric Sunbirds and will be Group Launching. No landing points, but must land within the area we use for the 1.5 MiniHiStart event. I may have given up on trying to use the recorded 6 minute version, it may be more fun having someone time your flights. Seven already have signed up for this additional event.

I would very much like to have a tribute event to commemorate Mark Smith and his Dad Ron for their Windfree design. This will be for electric powered Windfreees with Group Launching with an eight minute flight task. No landing points, but must land within the prescribed large area, same as the 1.5 , 2M and Sunbird events. I need a minimum of three flyers to enter this event or it won't happen. Please join in on this, I need a motivation to have an electric powered Windfree like Steve has. His was beautiful!

A new Wood Crafters field rule I never envisioned until this past Wood Crafters Reunion: "Persons not registered as participants can not fly anything."

This actually effects the CD's

responsibilities and liabilities since Wood Crafters is an AMA sanctioned event. Visitors are welcomed, they just can't fly anything.

Thanks to these folks that helped me and made Wood Crafters #9 a reality: Jack Smith, Barb Robinson, Chris Braman. Hope I haven't forgotten anyone.

And we will be forever grateful to the photographers and their great photos of our gathering.

Let's do this again, same time, same place.

- Ray Hayes
"Woodys Forever"



Perry S. Bell



Perry S. Bell



Scott Black



Tom Davies



Scott Black



Tom Davies



Perry S. Bell



Perry S. Bell



Scott Black



Scott Black



Scott Black



Scott Black



Tom Davis







Joe Sampietro



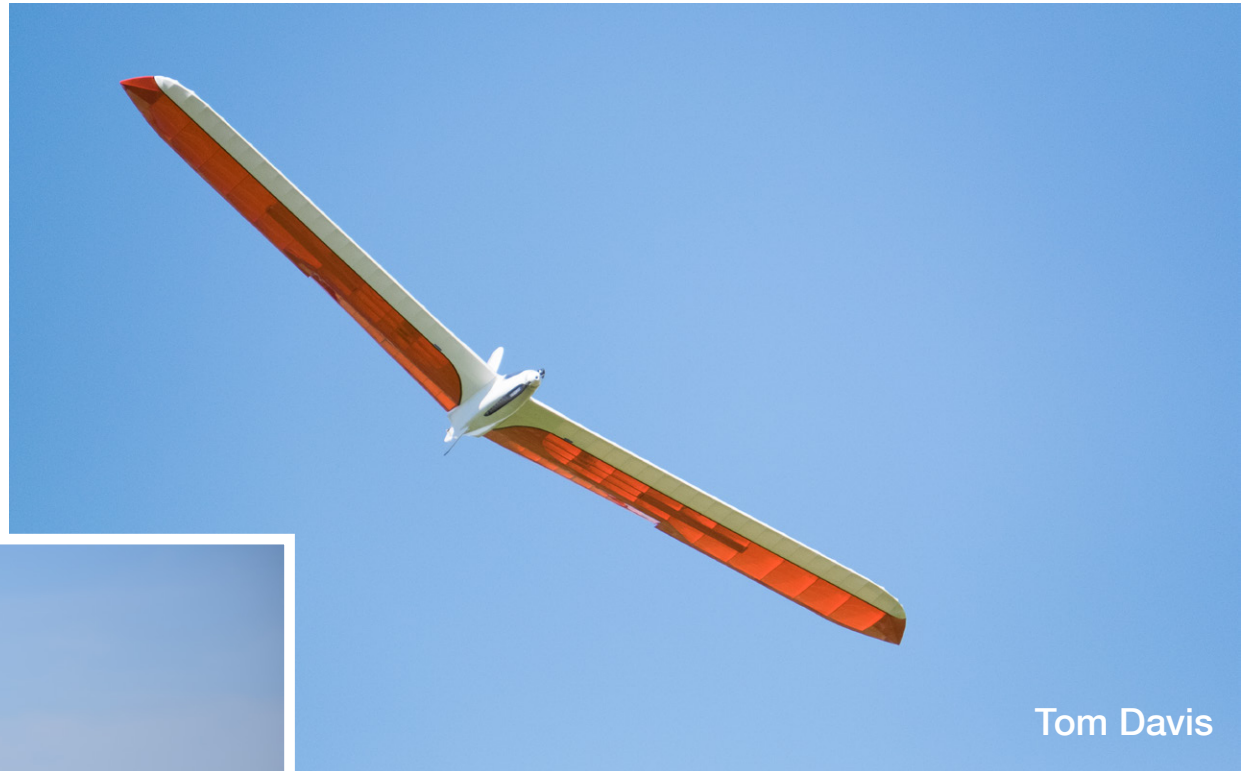
Joe Sampietro



Scott Black



Joe Sampietro



Tom Davis



Joe Sampietro



Joe Sampietro



Perry S. Bell



Joe Sampietro



Tom Davies







Perry S. Bell



Perry S. Bell



Perry S. Bell





Scott Black



Perry S. Bell



Scott Black



Scott Black



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Scott Black



Scott Black



Joe Sampietro



Perry S. Bell





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Joe Sampietro



Perry S. Bell





Perry S. Bell



Tom Davis



Perry S. Bell



Perry S. Bell



Tom Davies



Perry S. Bell



Joe Sampietro



Joe Sampietro



Joe Sampietro







Joe Sampietro



Scott Black



Scott Black



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Scott Black



Joe Sampietro



Joe Sampietro





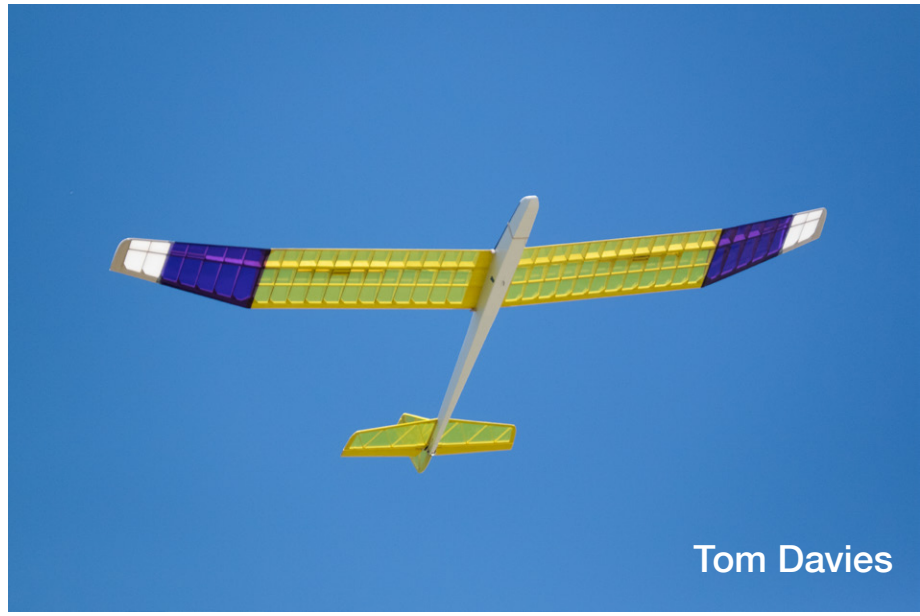
Joe Sampietro



Tom Davies



Tom Davies



Tom Davies



Joe Sampietro



Scott Black



Scott Black



Scott Black



Joe Sampietro



Joe Sampietro



Tom Davies



Tom Davies







Scott Black



Scott Black



Scott Black



Scott Black



Joe Sampietro



Joe Sampietro





Tom Davies



Tom Davies



Tom Davies



Tom Davies





Tom Davies



Tom Davies



Tom Davies



Tom Davies



Tom Davies



Tom Davies

Ray Hayes and Ken Bates, designer of the Windlord. Ken is accepting his award for Electric Flight Ladder.



Tom Davies

Ray Hayes (L), and Barb and Bob Robinson (R). Bob won the Longest Winch Launched Flight trophy.



Tom Davies



On the hills of Ranà

Text and photos from Elia Passerini, eliapasserini@valdelsa.net





Title page: The Ranà hills and the campsite.

Above: Sohaj 2, 1949, Czech Republic

There is a place up there from a corner of Europe to the east where, in a large valley, two reliefs with a steep slope rise up: they are the hills of Ranà. We are in the Czech Republic, the nearest village is Louny, 65 kilometers northwest of Prague and 100 kilometers south of Dresden.

For a long time I wanted to see them, knowing their existence through some of the local AeroKlubrana members met at previous meetings.

I knew that soaring was born there when some Prague aeronautical technology students discovered in 1932 an ideal area for flying, founding the steep hillside useful for the gliders.

When we arrived we met ideal conditions: mild temperatures with clean and windy skies.

The field has two grass runways 850 meters long, orientation 11/29 and the other one 04/22 in a slight slope with the two hills side by side as silent guards: at the sides of the slopes, between the trees and the club buildings, a small campsite was organized.

On the hills, a small tree plantation leaves the place in grassy areas to the top, and from there the glance spans a 360° view on a panorama of cultivated fields, small and large farms swept by woods.

The wind on the top is so strong that I, who have climbed to the top, can not hold the camera. From this point I can see the gliders soaring, taking advantage of the dynamic updrafts generated by the hill slope. With some circuits the gliders are able to climb. I can take shots of them from here at a very close distance. I feel so close I can touch them.

10 am in the morning: Briefing. Weather conditions are examined, while the less interested ones and non-pilots being curious about books, magazines, gadgets, and glider model design plans.



Dittmar Condor IV, 1953, Germany



Dittmar Condor IV, 1953, Germany



Dittmar Condor IV, 1953, Germany

Shortly afterwards, the hangar doors opened. The planes look like they are all similar, so close they are. They are placed with great care and are moved carefully on the front yard and then from there to the grass runway, ready for take off. Among them also three towing aircraft planes.

So fast and disciplined the gliders are placed on the runway aligned in a row and leave one after the other followed with great attention by all the spectators.

The glider being pulled by a tow-machine system slips on his skate and after a short run, without any apparent effort, it rises and climbs up to the established height where the tow disengages. Now he flies free, taking advantage of the dynamic updrafts.





*This page and opposite:
Scheibe Bergfalke II, 1955,
Germany*



Elfe S4a, 1956, Germany





Kaiser Ka 6 CR, 1955/1959, Germany



Spyr 5, 1942, Switzerland



I also ride with a pilot on a two-seater Condor IV and head toward the hills. The strong wind forces us to exploit the slope dynamics and with steep turns on the right and on the left, reversing the flying direction, we are able to climb up in altitude.



Kaiser Ka 6 CR, 1955/1959, Germany



Above: Hütter 28, 1952, Austria

Opposite: Kaiser Ka 6 CR, 1955/1959, Germany

Suddenly clouds come closer and a short storm develops with a heavy rain, forcing the planes to land very quickly.

The storm lasts a very short time and soon the sun comes back to illuminate the wet fuselages, with tiny water drops slipping over their wings and falling silently on the grass.





This page and opposite: *Kaiser Ka 8b*, 1957, Germany







Kaiser Ka 8b, 1957, Germany

Scheibe L Spatz 55, 1954, Germany





Scheibe L Spatz 55, 1954, Germany





SDZ 24-4 Foka 4, 1960, Poland







*This page and opposite: SDZ 24-4
Foka 4, 1960, Poland*





Kranich, 1935, Germany

*Opposite page: Slingsby Petrel, 1939,
Britain*





Slingsby Skylark 4, 1962, Britain



Slingsby Skylark 4, 1962, Britain



Kaiser Ka 7 Rhönadler, 1957,
Germany





Kaiser Ka 2 Rhönschwalbe, 1953/1955, Germany







*Above: Breguette 905 Fauvette, 1958,
France*

Right: Weihe, 1938, Germany





Slingsby T 30a Prefect, 1951, Britain



I also ride with a pilot on a two-seater Condor IV and head toward the hills. The strong wind forces us to exploit the slope dynamics and with steep turns on the right and on the left, reversing the flying direction, we are able to climb up in altitude.

Suddenly clouds come closer and a short storm develops with a heavy rain, forcing the planes to land very quickly.

The storm lasts a very short time and soon the sun comes back to illuminate the wet fuselages, with tiny water drops slipping over their wings and falling silently on the grass.

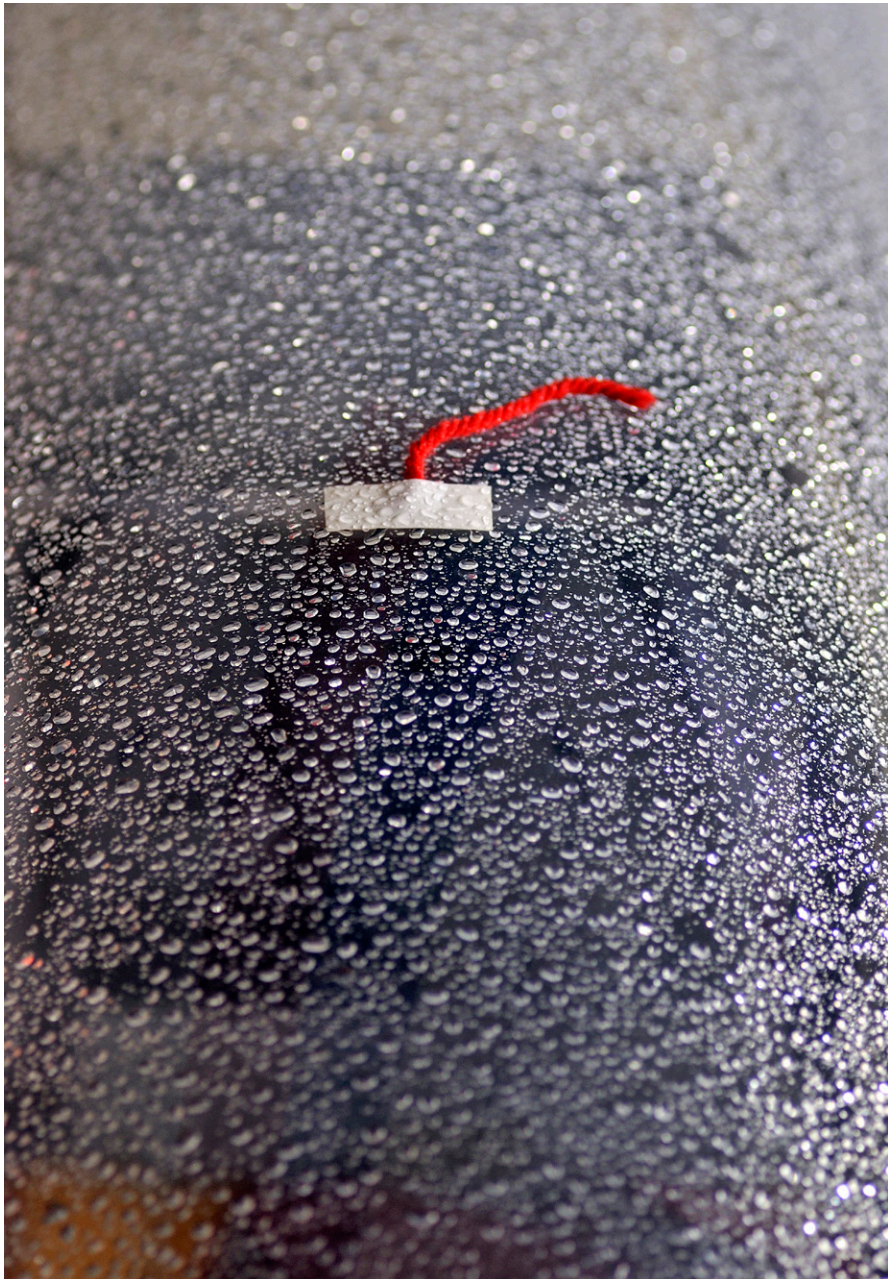


Above left: Kaiser Ka 2 Rhönschwalbe, 1953/1955, Germany

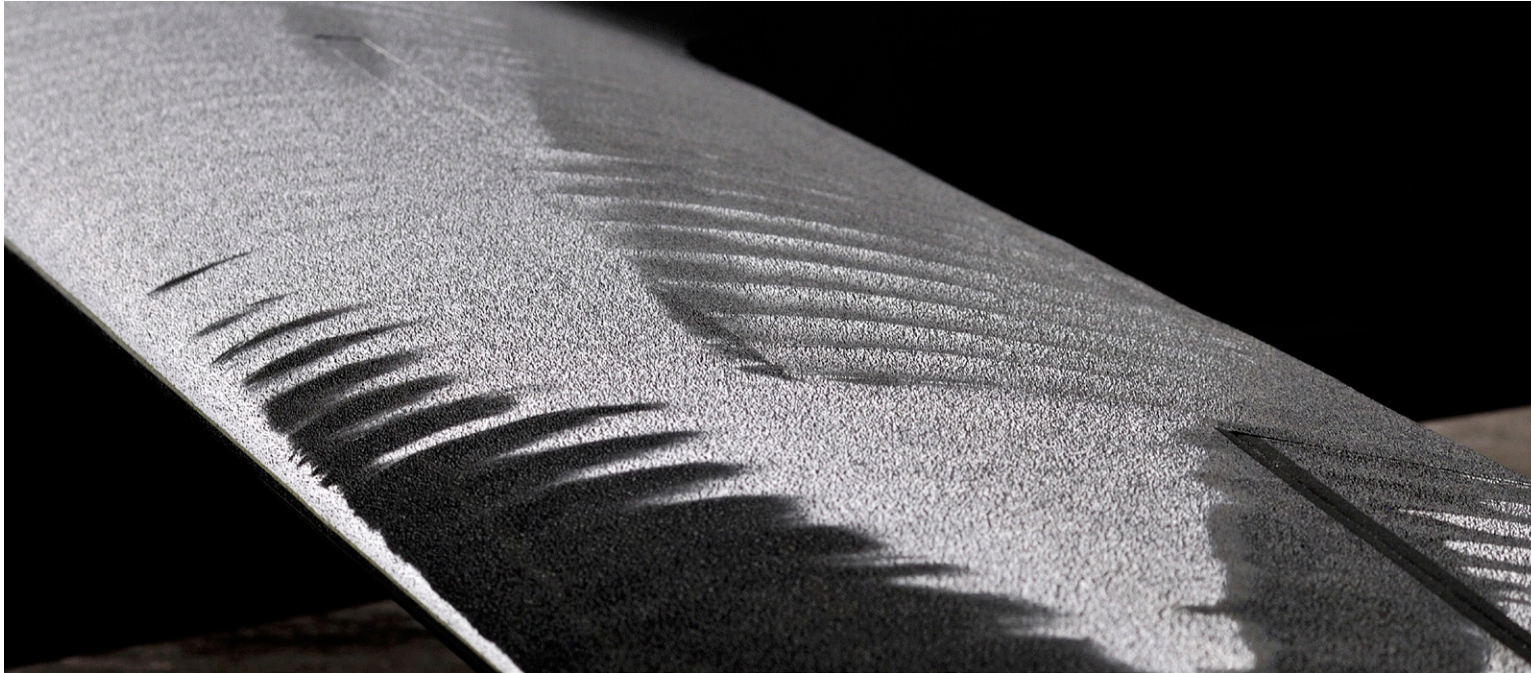
Left: Øgslund/Traugott-Olsen 2G, 1948, Denmark



The thunderstorm... The rain comes.



The rain ceases.





And after a short respite you get back to flying.



Science mimics nature; researchers test AI-controlled soaring machine

Allison Linn, <https://twitter.com/allisondlinn>



<https://news.microsoft.com/features/science-mimics-nature-microsoft-researchers-test-ai-controlled-soaring-machine/>

HAWTHORNE, Nevada – In the searing midday heat of the Nevada desert, a white Jeep Wrangler heads down a desolate strip of dirt road, surrounded on either side by miles of sagebrush and sand.

As the Jeep bumps along, two members of a Microsoft research team, Jim Piavis and Rick Rogahn, steady themselves against the roll bar, their feet planted on the seats and their upper bodies jutting out of the open roof. They are scanning the bright blue sky, tracking a type of glider known as a sailplane.

The delicate black, white and red sailplane swerves wildly and unevenly at first, and then gradually begins to make wide, soaring circles.

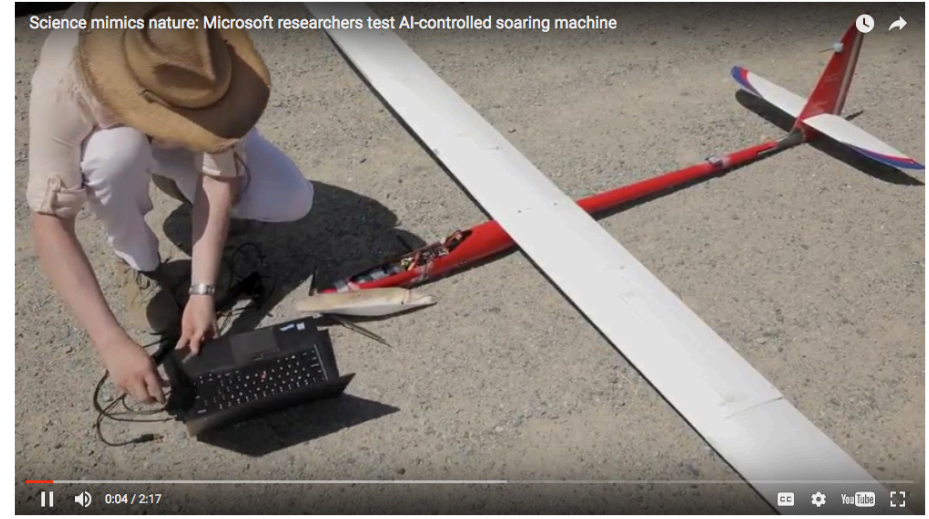
A hawk appears next to it, following the same circular pattern. “We’ve got a friend up there with us,” says Piavis, head of mission readiness. “That’s a good sign.”

The 16 ½ -foot, 12 ½- pound sailplane has found a thermal, or an invisible column of air that rises due to heat. Soon, it is soaring through the sky, the Jeep reaching speeds up to 30 miles per hour as it flies down the dusty dirt road in hot pursuit of what the team is calling the infinite soaring machine.

Microsoft researchers have created a system that uses artificial intelligence to keep the sailplane in the air without using a motor, by autonomously finding and catching rides on naturally occurring thermals, similar to how many birds stay aloft.

“Birds do this seamlessly, and all they’re doing is harnessing nature. And they do it with a peanut-sized brain,” says Ashish Kapoor, a principal researcher at Microsoft.

The birds do it naturally. For a machine to do it requires a complex set of AI algorithms that can identify things like air temperature, wind direction and areas where it is not allowed to fly. Then, the system must use other AI methods to take that information and make real-time predictions about where it might find its next ride on a thermal.



<<https://www.youtube.com/watch?v=daINKmR1M-4>>

Taken together, that’s much more complex than most AI systems people are using today for individual tasks like recognizing a face in a photo or the words in a conversation.

Kapoor says it’s probably one of the few AI systems operating in the real world that’s not only making predictions but also taking action based on those predictions.

It’s still a work in progress, but Kapoor says the infinite soaring machine could eventually be used for all sorts of practical tasks, such as monitoring crops in rural areas or providing mobile Internet service in a place where there’s no easy way to get needed connectivity.

“These can be your cellular towers someday,” Kapoor says. “You don’t need any ground infrastructure.”

Eventually, the team says, the sailplane could even use solar or wind power to gather energy, theoretically making it possible for it to stay aloft indefinitely.



From left, Debadepta Dey, Andrey Kolobov, Rick Rogahn, Ashish Kapoor and Jim Piavis prepare to launch a type of glider known as a sailplane in the desert in Hawthorne, Nevada.



Microsoft's aerial robotics research team prepares to launch a sailplane during a test flight in Hawthorne, Nevada.

AI in the real world

The autonomous sailplane is useful in and of itself. But Andrey Kolobov, the Microsoft researcher in charge of the project's research and engineering efforts, says they also expect the work to apply to plenty of other increasingly sophisticated systems that rely on AI and will operate in real, unpredictable environments.

"For us, the sailplane is a testbed for technologies at the core of anything that will be considered intelligent in the next 10 years," he says.

For people to depend on AI to help them with things like driving their cars, keeping their homes secure or managing their busy

daily schedules, these systems will need to reliably make complex decisions on the spot, based on variables such as traffic, noise, weather, other objects and even human emotions. What's more, they won't be able to make many mistakes – that would be costly and potentially dangerous.

"AI in the real world will have very little room for error, like our sailplane," Kolobov says.

In research terms, this kind of ability is called sequential decision making under uncertainty.

"It's really the question of, 'How do you plan for the future, several steps ahead?'" Kapoor says. "Computationally, that's a very hard problem."

AI theory in action

The sailplane they are testing in Nevada relies on a battery to run onboard computational equipment and controls such as the rudder, plus radios to communicate with the ground. It also has a motor so that a pilot can take over manual operation when necessary. But once it's up in the air, it's being designed to operate on its own, finding and using thermals to travel without the aid of the motor or a person.

“What we’re trying to do is make sure the sailplane is fully autonomous and smart enough to change its course of action,” Kolobov says.

To design the system, the team of researchers began with a framework for thinking about the problem called the partially observable Markov decision process.

Kolobov, who co-authored a book on Markov decision process, says that’s a model for making planning decisions in an environment in which you can’t know everything. With the sailplane, the team combined that model with another AI approach, called Bayesian reinforcement learning, to create a way for the system to learn what it needs to know about its environment as quickly as possible, in order to make the right decisions.

The team also is using what’s called Monte Carlo tree search, which is a way for AI to look for the most promising course of action.

The sailplane’s AI system is divided into two parts: The high-level and the low-level planner.

The high-level planner takes all the factors of the environment into account and tries to create a policy for where the sailplane should go to look for thermals. It gets better at making those predictions as time goes on, based on the information the sailplane collects each time it goes up in the air.

“For the high-level planner, experience matters,” Kolobov says.



Kapoor, in driver's seat, Rogahn, in blue, and Piavis, in white, watch as the sailplane attempts to find a flight path on its own using artificial intelligence algorithms.

“The system will perform better on Friday than on Thursday because it incorporates information based on past flights.”

The low-level planner is the part that is using Bayesian reinforcement learning to detect and latch onto thermals in real time, based on data from the sailplane’s sensors. Think of that as learning by doing.

Reality testing

To build those AI algorithms required months of work in offices at Microsoft’s Redmond, Washington, campus.

Once the weather turned warm and the thermals got better, the team conducted limited test flights on a farm near the company’s headquarters. But it wasn’t until they arrived at the



From left, Kolobov, Iain Guilliard and Sangwoo Moon monitor the sailplane's flight path and use of artificial intelligence.

tiny airfield in Hawthorne, Nevada, in mid-August that they really got a chance to see how all their theories would play out in the real world.

On the day that they spot the hawk, the team has been out on this stretch of dirt road for four days, battling dusty conditions and the blazing sun as they launch their sailplanes again and again.

Behind the Jeep, an extra-long burgundy Ford Expedition has been set up as a makeshift office, crammed with multiple computers, tools for field repairs and four other members of the research team. The blasting AC does little to combat the heat from the desert and the large amounts of computer equipment.

As the sailplane flies above them, research interns Iain Guilliard and Sangwoo Moon – both of whom wrote core algorithms that help power the system – use four laptops to track its progress and monitor how it is taking advantage of conditions including thermals.

Every few seconds, Guilliard calls out the sailplane's flight parameters, while those in the Jeep scan the air for physical proof of the sailplane's position. Kolobov and Debadepta Dey, a Microsoft researcher who built the sailplane's thermal prediction module, take turns driving the movable office after the Jeep and the sailplane.

In addition to catching thermals, the system needs to plan its actions to avoid certain obstacles, such as nearby mountains, a large lake and scores of munitions that the U.S. Army stores in the area near the test flight site.

The messy real-world environment, with all the quirks and obstacles that would be impossible to predict in the office, is providing the perfect testing ground for the system.

Many of the problems they encounter, and have to solve, have nothing to do with AI at all. A glitch in the communications system creates problems with the largest sailplane they are testing, and the team suspects that magnetic particles in the dust on the road are responsible for causing damage to an electronic component.

During one test, when they try to launch a sailplane using a bungee cord attached to the Jeep after a motor failure, the bungee cord breaks.

With each setback, the team patiently sets to work to find a solution: Fixing the motor, repairing the bungee cord, finding a new battery, pulling out another sailplane when one is taken out of commission.

Kolobov says these real-world problems are exactly what drew many people to this project. It's also why they aren't too discouraged by each unexpected thing they encounter.

“This is why reality is different from simulation,” Kolobov says. “And that’s what we came here for. We came here to learn, and it’s not necessarily the things we expected to learn.”

‘The algorithm is doing better than me’

It’s late on a Friday afternoon when the team gathers at the tiny Hawthorne airport for one last debrief.

About an hour earlier, on the team’s last flight of the trip, the algorithms had performed exactly how they’d anticipated, sending the sailplane soaring through the air – before the battery unexpectedly died, the sailplane nosediving toward the sand and sagebrush with alarming speed.

Rogahn, whose job was to be the human pilot – providing a backup to the AI and maneuvering it to safety when necessary – was able to regain control at the very last moment, preventing a crash by perhaps inches.

“It’s not polite to wear a cowboy hat indoors, but I feel like I’ve ridden a couple of bulls,” Rogahn says at the debrief, drawing laughter from the group.

But then Rogahn grows serious, removing the hat and acknowledging how far they’ve come during the long days in the desert.

“We’ve reached the point this summer where it’s actually doing better than me,” he says. “The algorithm is doing better than me as a sailplane pilot.”

Photos and video by John Brecher for Microsoft.

Allison Linn is a senior writer at Microsoft. Follow her on Twitter.

A parallel article appeared in the New York Times:
<<https://www.nytimes.com/2017/08/16/technology/microsoft-teaches-autonomous-gliders-to-make-decisions-on-the-fly.html>>



Rogahn monitors the sailplane’s flight path during a test flight near Hawthorne, Nevada. Rogahn is the team’s human pilot, meaning he is responsible for manually launching and landing the aircraft, and for intervening if it is necessary for safety.

Rick Rogahn posted the following within the Seattle Area Soaring Society email list:

Some details on the software:

High Level planner - Tells the glider where to go, applies policies like geo-fencing and altitude limits

Low Level planner - This is the soaring algo, tells the sailplane how to exploit a thermal

PID loop / Stability - Stabilizes the aircraft in flight while it maintains target airspeed and if turning, bank angles.

The high level planner uses a couple of different inputs to determine thermal locations and where to fly. The first bit



<https://static01.nyt.com/images/2017/08/15/business/16GLIDER1/16GLIDER1-superJumbo.jpg>
Photos by John Brecher for Microsoft

uses computer vision. It scans aerial imagery for nearby areas that have a high potential for generating thermals. It also uses historical data over a geographic region to 'score' areas near the sailplane that have produced lift in the past. The high level planner also determines the boundaries to stay within, in three dimensional space.

The low level planner has three basic modes: Search, Explore and Exploit. Search uses telemetry from sensors on the aircraft to determine if it is in lift (vario, temp, etc...). Explore executes a search 'pattern' to determine the edges of the thermal and Exploit works to 'core' the thermal. While in lift, the software can bounce between explore and exploit a bit on the way up as vertical velocity changes.

PID loop / Stability software is always working to keep the plane at the optimal airspeed for the task at hand. Think cruise control / auto pilot. We did extensive testing to get a very accurate L/D curve for the aircraft (couple early mornings). This curve is used to at different times in the flight. Imagine if you could lock max L/D while thermaling, our software does it and very well I might add. The L/D curve is also used in stall prevention. We have software that runs in the PID loop to limit bank angles for instance as well to prevent stalls (we don't have an AOA sensor unfortunately).

For airframes we used Radians as our test platform for new software, a Shadow for intermediate testing and two Thermik XXXL's (5m w/s) for our 'production' code testing.

[The Thermik XXXL is produced by Valenta Model, Czech Republic, <<http://www.valentamodel.cz/50a.htm>> and is available through both Soaring USA <<https://www.soaringusa.com/Thermik-XXXL-5M.html>> and Icare-Icarus in Canada <http://www.icare-icarus.com/Thermik-XXXL-mk2-Carbon_p_947.html>.]

In a later email Rick explained the complex regulatory framework under which this project is being developed:

AMA is not involved and honestly shouldn't be (I'll explain, don't jump to conclusions just yet).

The testing that we do locally is done under the ever watchful eye of the FAA. We are a corporation and have to follow a different set of rules than a recreational flier. That is the reason we went to NV for our recent round of testing.

Hawthorne, NV is a designated test facility with special COA's from the FAA. NIAS is the organization that controls the testing there and their people were on site the entire time monitoring our tests. All team members also had to get full background checks from the U.S. Military. Believe me, the number of hoops we have to jump through and agencies that we need to involve is non-trivial.

On the regulatory side, everyone knows what we are doing and when we are doing it and where. Any failure of our aircraft has the potential to come under the investigation of the FAA and NTSB.

Flight planning, execution and most of all safety is taken very, very seriously.

Some members of this Microsoft research team are also members of the Seattle Area Soaring Society. For information on the SASS organization, including membership, flying sites and current events, please visit the SASS web site at <<http://www.seattleareasoaringsociety.com/>>.



Catch-and-release sloping

Philip Randolph, amphioxus.philip@gmail.com

Steven Allmaras called a slope trip to Whidbey Island for Sunday, July 16, 2017. He put it out to CEWAMS, SASS, and RC Groups. Philip showed up.

Well, that's not so bad. So Steven and Philip (me) went caught the ferry to Whidbey. On the way I got caught and released, but that happens all the time. I doubt they even notice, or just take it for granted that they are good at their sport.

Whidbey is about thirty miles long, starting thirty miles north of Seattle. It runs up Puget Sound. Its northern half looks out across the Strait of Juan de Fuca, dividing the US Olympic Peninsula from Canada's Vancouver Island. The world is actually flat, but since Einstein proved that mass bends light to curve away from itself the illusion is that the Pacific Ocean, off there in the Western distance, has a horizon. But you all studied that.

We started out at Ebey's Landing, about halfway up the western side of the island. The wind was light.

Now here's an odd thing. I've seen Steven bring some pretty fancy crunchies on CEWAMS slope trips to Chris Erikson rock piles. Please recall that if doesn't have rocks to land on or at least between Chris doesn't like it. But I've never seen Steven haul a really good discus launch glider along. Well, Whidbey has some good landing zones, provided you land in the good landing zones.

Steve, Snipe and Philip's Red Vee at Ebey's Landing.



Steven was flying a Snipe DLG, by Ukraine's Vladimir Models, the same outfit that makes the Supra. It flew great on the low steep bluff of Ebey's Landing. Ebey's has a plowed farmer's field right behind its bluff, until you get up the hill.

Oh, I should clarify. It's the field that is plowed, not the farmer, whether we get up the hill or not. We did. Well, we don't know if the farmer is plowed, or was at the time of writing. I think plowed is vernacular for being drunk. The field was mown grass when we were there, but I remember one time when his tractor was going back and forth and the seagulls

were diving for worms or upturned moles and it looked like they were being turned up out of the ground, so I wrote some lies about how mama seagulls lay their eggs in the field in the fall and they hatch in the warm earth and the farmer comes along in the spring and plows them up and they boil straight out of the ground into the air.

Uh, where was I? Oh yeah. On the bluff. Barely staying up. Making good landings in grass. With an old Monarch II fuselage to which that I fitted one of Adam Weston's DLG wings. Flew pretty well, though it needed a bit more breeze. And



Steve launching his Snipe at Ebey's Landing.

though I have to hold the aileron stick to the right while turning on the transmitter or the miserable Orange receiver makes the servos chatter. But the first one I tried was worse. It moved the ailerons in jerky little steps. No wonder they were on sale. Bother.

And then the red kluge started not quite making it up the bluff. Searching for lift. Fickle air. I ditch, about thirty feet below the lip. I go down after it. It's just below where it gets steep. Yeah, I get to it, but I'm holding onto clumps of grass while my feet slide. I'm thinking I may have to slide down another forty feet, down to

where folks play on the beach between fly fishermen, if I can't make it back up. Bother. Well, I plant the glider a couple feet uphill from me, gain three feet and slide back two, so that works. Progress.

Now about those fishermen, below us, wading a few feet into the water. They have something in common with us slope flyers. Females and Buddhists and things can go to scenic places and just appreciate Nature, but guys have to do something to be with Nature, like throw things at it, rocks or toy airplanes or fly lines, it doesn't matter what.

Salt water fly fishermen never catch any fish, just as we're not catching much air, but we're all having a great time having a manly excuse to be in someplace gawrdawful pretty.

Now, salt-water fly fishermen would be catch-and-release, mostly, if they were catching anything. They are actually just the result of fancy fly fishing shops holding casting classes and selling fancy gear to guys who want a legitimate excuse to be out in Nature.

But this day the only person who was actually successful at catch-and-release was a gorgeous young woman on the ferry boat headed over. Steve and I had been hanging by the unglazed windows of the upper car deck as the ferry approached the Whidbey dock. She came up to my right and asked in a slightly worried voice, "How close are we?" I said, "I'm about three feet from you." So we talked for a little bit. I was hooked of course, but she catches men all the time.

Now, before you ask what the heck this has to do with toy airplanes, well, she had said her father was doing a crab feed and I said "We're going to Fort Ebey to chuck radio controlled gliders off bluffs." And she said, "Cool. When I was ten my father gave me an RC airplane for my birthday. My brother flew it until it broke." Which indicates the father got her brother her present for her birthday,



Philip and his Red Vee at Fort Ebey.

but she didn't seem aggrieved. See? Relevant to *RCSD*. She had me hooked of course. But catch and release. I mean, gawrd, a 68-year-old nerd and a twenties model. That's not going to happen. So, catch and release. But not before enough subtle communication that I wondered if her brother ever got what only she wanted for his birthday, and hints of a split family? So, some actually human exchange, also. As the boat docked she headed for her car, leaving me flopping on the bank, gasping for air, or water if in this analogy I'm a fish.

Further up the bluff the hill gets high. We've seen somebody up there flying

what looks like a white Gentle Lady, in better lift than here. So we go up. He's gone.

We walk a mile further near the top of the high bluff, topped by trees, far enough to see that it goes and goes. We head back. By the time we get back to where he was flying the wind is sheering. Bother.

We eat lunch on a beach log, watching the failing-to-catch (or release) fly fishermen, and head north a few miles to Fort Ebey.

Now I have a theory about attempting to fly Puget Sound sites, and especially those north of the convergence zone

usually near Seattle, where winds parted by the Olympic mountains to the west slam back together. Since the ice age glaciers carved Puget Sound roughly north to south most of the slope sites face west or east. So we watch for west winds, and charge up there, and then find sheer. My theory is that ice age glaciers and air, both being liquids, tend to follow similar paths. No matter what the weather reports, air wants to flow north or south in Puget Sound.

Fort Ebey faces west to WSW. Steve heads down the slope from the gun emplacement site and across a huge mowed field to its bluffs and is flying great. I tell a couple guys at a picnic table, "I'll be darned if I carry my glider across that field. It can carry itself." It flies great, for five minutes in front of the mini-bluff above the field. And then it's down for a soft landing. Fort Ebey has a great landing zone, as long as you land in it.

Steve is flying his Snipe quite well, about 40 feet above the lip of the bluff, which is higher and steeper than what we flew at Ebey's Landing. But the lift is a little squirrely. My plane barely makes it back to the top of the bluff a couple times.

And then the Snipe is twenty feet down. I'm thinking about asking the Ranger for a rope. Steve gets it. Cautiously, kicking footholds in the scree, grabbing tufts of grass. Nasty retrieval spot.



Steve retrieving his Snipe at Fort Ebey.



About then the air decides the glaciers were right. The wind sheers straight from the north. Zero slope lift. Steve does some fine discus launches until his Snipe catches a wingtip in the grass, ground loops, and cracks the support of the vertical stab. Easily fixable, but not here. Whidbey Island has played catch-and-release with us, released back to Seattle.

Postscript: The ferry trip back. If you are the mother who took pictures of your children from across the forward facing observation wings of the passenger deck, the fellow who wrecked your picture by making a goofy face with his tongue lolling out is me. Gawrd, you can't take him anywhere. Heh.

Philip and his Red Vee at Fort Ebey.



FRSKY G-RX8

OVERVIEW

This receiver is specifically designed to be used for gliders. FrSky built the variometer sensor into the RX8R receiver. This will give you telemetry data like altitude and vertical speed.

The G-RX8 supports the redundancy function as well. This means you can add on another receiver to create a back-up in case one fails.

In addition, it supports both SBUS and PWM modes, and you can switch between the two channels very easily.

SPECIFICATIONS

Dimension:	55.26*17*8mm
Weight:	5.8g
Number of Channels:	Up to 16 CH
Operating Voltage Range:	4.0 -10V
Operating Current:	100mA@5V
Operating Range:	Full range
Compatibility:	D16 mode
Firmware Upgradable	



FEATURES

- Integrate with high precision variometer sensor
- Support redundancy function
- Support telemetry data transmission
- Switchable SBUS/PWM mode (1~8CH from PWM outputs and 1~16CH from SBUS output)

Retail Price (Tax Excluded): US\$34.99

G-RX8 Details:

<<https://www.frsky-rc.com/product/g-rx8/>>

Martin Simons' SAILPLANES *again available!*

Paul Remde, paul@remde.us

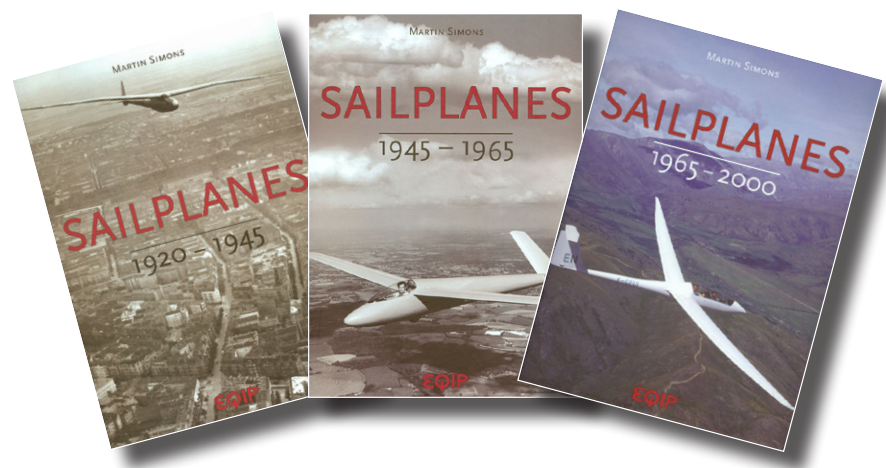
I have always been a fan of the old “Wings” TV programs that document the development and refinement of unique aircraft. It is interesting to learn about the many failures and lessons learned during the development process - and to see interesting film footage of the flights of the aircraft.

I find the “Sailplanes” series of books by Martin Simons to be similar to the “Wings” programs because they allow the reader to travel back in time to learn about the development of sailplanes over the years. The books are created for anyone that is interested in sailplanes.

Martin created hundreds of scale line-art drawings of the sailplanes that show the elegant lines and design details of the aircraft. The drawings are detailed enough to be used by modelers to create accurate scale models.

I have read all three “Sailplanes” books from cover to cover. I thoroughly enjoyed every page. I thought I had previously seen photos and details on most of the sailplanes in the world - boy was I wrong! I learned of many obscure and interesting sailplanes from manufacturers and private builders around the world. I especially enjoyed the overview information found in the Preface and Introduction sections at the beginning of each book.

The books are well organized so that they can be used as a reference when looking for information on any rare or not-so-rare sailplane. The books are not inexpensive, but they are worth every penny.



“Sailplanes 1920-1945”:

<<https://www.cumulus-soaring.com/books/Simons/Sailplanes-V1.htm>>

“Sailplanes 1945-1965”:

<<https://www.cumulus-soaring.com/books/Simons/Sailplanes-V2.htm>>

“Sailplanes 1965-2000”:

<<https://www.cumulus-soaring.com/books/Simons/Sailplanes-V3.htm>>

Also available from Cumulus Soaring, Martin Simons’ “The World’s Vintage Sailplanes - 1908-45”:

<<https://www.cumulus-soaring.com/books/Simons/VintageSailplanes.htm>>

Thanks to Simine Short and the Vintage Sailplane Association for sharing this with RCSD.

<<http://www.vintagesailplane.org>>



“Workshop Practice,” the English Translation of the German classic, “Werkstattpraxis für den Bau von Gleit-und Segelflugzeugen” by Hans Jacobs and Herbert Lück, is available directly from the VSA and through Cumulus Soaring:

<<https://www.cumulus-soaring.com/books/WorkshopPractice/WorkshopPractice.htm>>





*A Speedo flying at The Bluff, South Australia.
This is a video grab from Adam Fisher's hat cam.
The Speedo is sold by thebuildrc.com <<http://thebuildrc.com>>.*

*The Speedo spans 1.4m and features balsa built-up wings
with Oracover. Controls include ailerons and flaps, and it has a
fiberglass fuselage.*