



# The Transmitter

Suburban RC Barnstormers - P.O. Box 524, Bloomingdale, IL 60108

AMA CHAPTER 640

August 2018

<http://www.suburbanrcbarnstormers.com>

## **Coming in August and September**

August 19<sup>th</sup>, Fun Fly, Pratt's Wayne field, 9:00am Trim, 10:00am First Contestant

August 20<sup>th</sup>, Member Meeting, Itasca Public Library, 7:00pm

September 10<sup>th</sup>, Member Meeting, Itasca Public Library, 7:00pm

September 16<sup>th</sup>, Fun Fly, Pratt's Wayne field, 9:00am Trim, 10:00am First Contestant

September 22<sup>nd</sup>, Interclub Fun Fly, Pratt's Wayne field, (Sat) 9:00am Trim, 10:00am First Contestant

## **Let's Get Ready to Beat the Propmasters!**

*By Scott Taylor*

We will be continuing our long running annual tradition to have a Fun Fly fly-off with one of our other local clubs, the Propmaster. To be honest, this year we were concerned we might not have enough pilots for a competitive event, but we have about 8 pilots committed to fly so far, and we hope we can get a few more before the wheels leave the ground.

Although things are still very preliminary, we are looking to have our Interclub Fun Fly on Saturday September 22<sup>nd</sup>. This will give us our next two fun flies, on August 19<sup>th</sup> and September 16<sup>th</sup> to practice for the event.

Since we will be hosting the event this year, we will be flying at our field, Pratt's Wayne Woods. But that means the guest club gets to pick the

event. The Propmaster's have previously demonstrated great skill dropping washers over a spot target and it appears they want to continue with what works!

Our next fun fly will be on Sunday the 19<sup>th</sup>. Yes, THIS SUNDAY! This is a great opportunity to share and test ideas for drop mechanisms and techniques. The Propmaster's usually have a specific size and weight washer for the event. Past mechanisms have included trap door boxes, releases with a pin running through center of the washer, and the traditional vertical post.

So please join us on Sunday for the flying and the fun!

# Notes of the Suburban RC Barnstormers Membership Meeting

## July 9, 2018

### ATTENDANCE

There were 15 members present at the July meeting held at the Itasca Public Library including new member Ron Micek. Ron got interested in RC flying in the mid-70s and started building a trainer, but didn't finish it, until now! Ron is also a "full-scale" pilot who hasn't flown in a while but is getting current again.

### OFFICER REPORTS

**President: Hector Rivera** said thanks for all the help at the 6/24 Fun Fly. Members helped cut out gliders for use at the Maywood Sportsman's Club event.

Hector said **Steve Thill** has been helping new flyers on Thursday evenings at the flying field. Many thanks to Steve!

August 13<sup>th</sup> is next meeting and there is no Board meeting in August. (*Editor note: Member meeting was rescheduled to August 20<sup>th</sup>*).

**Vice President: Paul Kramer** had a number of door prizes to pick from this evening including a precision knife set, screw driver, light silk span, milled fiber glass, fuel filter, carbon fiber, and exhaust deflector. There will be two winners.

**Treasurer: Bob Vance** reported we had a bit under \$6000 in the bank.

Bob showed members the assembled UpRoar that was our new rollover raffle. This plane was masterfully completed by Keith Egging

with the electric conversion. All it needs is an ESC and radio and will be ready to fly.

Bob had a Top Flight "Nobler" kit that was free for the taking.

Bob also heard that Naperville's Bush Hill Park would be open again for indoor flying starting October 1<sup>st</sup>.

**Secretary: Scott Taylor** said he would be filling in for Offie who was working tonight and couldn't make the meeting.

### EVENTS

**Marty Schrader** went over the details of our participation in the Maywood Sportsman Club picnic on Saturday July 14<sup>th</sup>. We have volunteered to do a "Make and Take" activity to introduce kids to flying. It is a large event that could have as many as 150 kids. In addition, we have planned flight demonstrations and competitions with prizes. The event will run from about Noon until 6:00pm.

### ENTERTAINMENT

Paul Kramer tried something new for entertainment. He ran an internet video about repairing an EPP foam airplane hinge. It was very helpful with some good tips.

**Door Prizes – Stanley Crowe** grabbed the fuel filter and **Hector Rivera** took the knife set. **Paul Kramer** took the turkey!

Below are pictures from Maywood Sportsman Club event.





# Bits and Pieces Related to Our RC Model Airplane Hobby

by: Bob Sarley

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Welcome to this issue of the "Final Approach". These articles are intended to provide additional information and insight into our RC model airplane hobby. I hope you find the articles informative and useful (questions or suggestions for topics are always welcome).

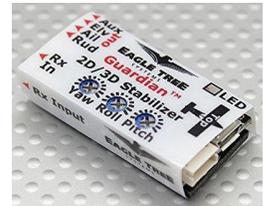
The topic for this issue is: **Autonomous Flight – The Next Evolution of RC Flight Assisting Electronics**

What was once considered the exclusive domain of the military or NASA has trickled down into the attainable realm of the RC model aircraft hobbyist. Low cost systems and devices are now available that can be applied to fixed wing aircraft, helicopters and multi-rotor drones that can do everything from assisting the pilot's control of his/her aircraft in a stiff crosswind, bringing the aircraft back to level flight if it gets out of control, enforcing adherence to a predetermined flying area to even autonomously landing the model aircraft at the issuance of a transmitted command.

Let's start with a colloquial definition of "autonomy" as it relates to vehicles (airborne and otherwise).

*The navigation and maneuvering of a vehicle by a computer without the need for human control or intervention under a range of vehicular situations and conditions.*

Before autonomous flight control, there were 3-axis flight stabilizers. Flight stabilizers have been around for a long time. I myself use a device from Eagle Tree (the Guardian) that will respond and adjust the control surfaces to compensate for wind buffeting much faster than I could respond with control stick input. Taking computerized assistance a step further, it will lock my plane on its established heading when I center the sticks and it will keep it there as long as it is aerodynamically possible or I input a directional change via the transmitter control sticks. When you are at the flying field and see me do a 45 degree up-line and rotate to inverted for the Reverse Half Cuban Eight, I am letting the Guardian hold the up-line (no additional corrective elevator input from me) while I attend to the aileron role to inverted. Once the wings are horizontal, I release the aileron stick and let the Guardian maintain that attitude for the remainder of the up-line portion of the maneuver. I only need to input up elevator to complete the maneuver. Although the pilot is still responsible for maintaining proper airspeed and directional control, the stabilizer provides a significant reduction in pilot workload.



Enter now the realm of autonomous control. The current capabilities of the Global Positioning System (GPS) provides typical positioning accuracy in the  $\leq 7.8$  meter (~25 feet) range for 95% of the Global coverage. The positioning accuracy in many of the 48 contiguous states is closer to 3 meters (~10 feet). This level of positioning accuracy makes autonomous model airplane flight (and many other things) feasible.



Airborne RC model radio equipment manufacturers such as Spektrum (and others) have reduced both the size and cost of GPS receivers to the point where the average hobbyist can afford the technology. By incorporating GPS positioning data into sophisticated flight controllers, programmed autonomous flight scenarios can be implemented.



Model aircraft manufacturers such as HobbyZone are offering ARF airplanes that incorporate both GPS receivers and sophisticated flight controllers. The Carbon Cub S+ (pictured below and in my Final Approach logo at the top of the page) is one of those aircraft.

## The autonomous flight experience with a HobbyZone Carbon Cub S+

The Carbon Cub S+ is an easy to fly semi-scale RC airplane based on the full size Carbon Cub by Cub



Crafters (which is modern iteration of the classic Piper Super Cub). The HobbyZone “bind and fly” rendition is an EPO foam model weighing in at 2.3 pounds with a 51” wingspan, 480 size motor, 18 Amp ESC, installed micro servos, Spektrum SPM4647 Receiver, Spektrum SPMA3232 Flight Controller and Spektrum SPMA3173 GPS module. The large “tundra” tires make it easy to lift off and land in a grass field and it will run for 6 minutes on a 3S-2200 LiPo battery.

The autonomous flight capabilities of the Carbon Cub S+ currently come in the following forms: 1) Holding Pattern, 2) Virtual Fence and 3) AutoLand.

**Holding Pattern:** This feature lets you essentially take a break from piloting a flight by putting the airplane into a GPS-guided holding pattern. When activated, the ground position aware flight controller will take over and the Cub will automatically return to a position approximately 35 meters (120 feet) above the GPS initialization take-off point and circle that location until the Hold Pattern function is cancelled (at which point control is given back to the pilot).

**Virtual Fence:** Virtual Fence creates an invisible boundary that is identified via GPS positioning data and beyond which the airplane will not fly. When the Cub encounters this boundary, it will automatically turn around and fly back toward the GPS initialization point. When safely back in the fly zone it will wag the wings to let you know you now have control.

**AutoLand:** When activated by the pilot, the AutoLand function puts the Carbon Cub S+ on a stabilized approach to autonomously land near the GPS initialization point. Since the take-off point and direction were initially provided to the flight controller via GPS positioning data, the Cub knows where to go and will automatically establish a landing pattern which includes a downwind leg, turn onto final, align itself in the upwind direction, perform a controlled descent to the ground and power down the motor.

Where the Holding Pattern and Virtual Fence functions are 100% autonomous (overriding any command input from the pilot while engaged), AutoLand allows you to provide some directional guidance to avoid obstacles or to adjust the approach while letting the system do the rest to execute a safe landing. The AutoLand function can be aborted at any time by command from the transmitter and full control given back to the pilot.

For those of you who were ever concerned about what happens if RF contact with the airplane’s receiver is lost (bad antenna orientation, weak battery, accidentally shut off the transmitter, etc.) while in flight, autonomous GPS flight to the rescue. The Carbon Cub will automatically revert to “Holding Pattern” until it the radio connection is reestablished. If radio connection is not regained after approximately 30 seconds, the aircraft will revert to “AutoLand” and land near the takeoff location.

These autonomous functions in addition to the Panic Recovery capability inherent to the SAFE technology built into the flight controller (which will automatically return the airplane to level flight at the press of a button if in a bad situation) make the Carbon Cub S+ an interesting and easy plane to fly by experienced pilots and provides a progressive learning curve for those fledgling newcomers to the three dimensional RC world.

As with the assembly and flight of any new airplane, conscientious and comprehensive reading of the manual and strict adherence to the set-up and configuration procedures now needed to “educate” the flight controller is quintessential to the success of the maiden and subsequent flights.

As for the ongoing evolution of autonomous RC flight, one can only imagine what might be coming next.

# The Transmitter

This newsletter is published monthly by the Suburban RC Barnstormers, Inc.

We reserve the right to edit all information forwarded to us. Permission is hereby given to reprint any article that we publish as long as proper credit is given.

Material can be submitted for publication: (1) at a meeting, (2) by mailing to Suburban RC Barnstormers, Inc., P.O. Box 524, Bloomingdale, IL 60108, (3) sending it to the email of the editor, Scott Taylor, at [taylorstr@core.com](mailto:taylorstr@core.com)

Articles must be received by the 4<sup>th</sup> Saturday of the month to be included in the following month's newsletter.

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