# The Flightline

**Volume 48, Issue 13 Newsletter of the Propstoppers RC Club AMA 1042 January 2018**

***Agenda for January 12th Meeting At***
***Gateway Church Meeting Room***
**7:00 pm till 8:30**

1. Call to Order and Roll Call
2. Treasurer's Report
3. New Business.
4. Show and Tell
5. Adjournment.

**INSIDE THIS ISSUE**



## President's Message

**I hope you all enjoyed the holidays and are looking forward to a new year of aeromodelling. Even though the days are now getting longer, we can look forward to some serious winter months before the fields will be green again. This is the time to hunker down in the shop and pick up the building and repair projects that have been waiting patiently. Enjoy these relaxing moments while they last.**

**We had a lightly attended indoor session on December 9th due to the snow storm. But the six people who did attend brought helicopters, multirotors, 3D planes and indoor rubber band models. We have our next indoor flying session coming up on Saturday January 6th at the Brookhaven Gym. Let's hope for good weather and a big turn-out for a fun evening of flying and friendship.**

**Another thing that comes with winter is the schedule of trade shows and swap meets that we all enjoy. Keep your eye on the event calendar at the back of your Model Aviation Magazine to see what is coming up near us. If you plan to go to an event, think about letting the rest of the members know your plans through the email list or Yahoo Groups. See if you can set up a car pool. For me, these events are always more fun when you are with friends.**

**Finally, our recent member survey tells us that Show and Tell is among everyone's favorite parts of the monthly meetings. Please think about what you might have to say or show. If everyone takes a turn we will be guaranteed a good meeting every month. If you can, give me a call to tell me what and when you want to show something. That way I can plan out the meetings a few months ahead. But, last minute walk-ons are always welcome too.**

**I look forward to seeing you all at the January meeting.**

**Best wishes for a happy new year,**

***Dick Seiwell, President***

## Minutes of the Propstoppers Model Airplane Club

**December 12, 2017 at the Christian Academy meeting room;**
**For the annual holiday meeting and party.**

**The meeting was called to order at 7:10 pm by Vice President Chuck Kime.**
**There were 26 members present.**

**The formal meeting concluded at 7:20 PM so that all members could enjoy the hoagies, desserts and snacks that were available. Then, members mingled and engaged in animated conversations while enjoying the spread.**

**The event adjourned at approximately 8:30pm.**

### Calendar of Events

#### Club Meetings

Monthly Meetings
Second Tuesday of the month.
Gateway Community Church. Doors open at 7:00

**Next Meeting;12th of January. at the Gateway Church Meeting Room**

Tuesday Breakfast Meeting
Tom Jones Restaurant on Edgemont Avenue in Brookhaven. 9 till 10 am. Just show up.
Flying after in the summer at CA or Elwyn Field 10 am. Weather permitting.
Indoors at the Brookhaven Gym in winter 10:00-11:00 (subject to availability of the gym).

#### Regular Club Flying

**At Old Christian Academy Field**; Electric Only
Monday through Friday after school till dusk
Saturday 10 am till dusk
Sunday, after Church; 12 pm till dusk
At Elwyn Field; Gas or Electric
Monday through Saturday 8 am till dusk
Sunday 12 pm till dusk
INDOOR Flying, see attached dates.

#### Special Club Flying

Saturday mornings 10 am
Wednesday Helicopter evening in summer
Thursday evenings in the summer
Tuesday mornings 10 am weather permitting after breakfast.
Check our Yahoo Group for announcements;
http://groups.yahoo.com/group/propstoppers/

#### Beginners

Beginners using due caution and respecting club rules may fly Apprentice or similar models without instructors at Christian Academy Field.
The club also provides the AMA Introductory Pilot Program for beginners without AMA insurance.

**Propstoppers RC Club of Delaware County, Pennsylvania.**
**Club Officers**

| | |
|---|---|
| President<br>Dick Seiwell<br>(610) 566-2698 | reslawns@verizon.net |
| Vice President<br>Chuck Kime<br>(610) 833-5256 | chuxtruk@vahoo.com |
| Secretary<br>Richard Bartkowski<br>(610) 566-3950 | rbartkowski@comcast.net |
| Treasurer<br>Pete Oetinger<br>610 627-9564 | Pete202@iuno.com |
| Membership Chairman<br>Ray Wopatek<br>610 259-4942 | raywop@gmail.com |
| Safety Officers:<br>Eric Hofberg<br>610 566-0408 | bgsteam@comcast.net |
| Ryan Schurman | Throttle152@hotmail.com |
| Newsletter Co-Editors:<br>Dave Harding<br>(610)-872-1457 | Davejean1@comcast.net |
| Larry Woodward<br>610 891-7936 | Woodward.larry@gmail.com |

**Propstoppers Web Site; www.propstoppers.org**



## 2017/18 Indoor Flying at the Brookhaven Gym

**January 6, February17, March 10:**

**6:30-9:00 pm.**

**Flying after Tuesday Breakfast 10.00am**

## Editors' Note:

This month's issue, produced primarily during the hectic couple of weeks surrounding the Christmas holiday, has been made possible only by the generous efforts of a loyal and supportive membership.

We want to give special thanks to Dick Bartkowski for an excellent article detailing his research and development of adaptive electronics for indoor free-flight models. His article chronicles a decade or more of experimentation with battery, power and control systems that spans the era from NiCad to LiPo, and demonstrates clever use of capacitors in various power control scenarios.

Dave Harding and Chuck Kime give us a run down on the various academic programs that they support at local colleges and universities. This outreach activity in the name of Propstoppers gives us visibility and credibility in the community.

These articles give us a glimpse at the level of experience and knowledge that we have in our club, not just in these individuals, but across the membership. Brought to light, the collective knowledge and experience of our combined membership would be the envy of any AMA chapter. It is the job of this newsletter to bring that light and expose that reality to our membership and the community.

So, let's keep the light shining brightly. Please everyone, consider what you might be interested in sharing from your experience. Each of you brings a unique interest and point of view to the club. Your value may be in a particular technical expertise or aeromodelling skill, or it may stem from sharing your passion and enthusiasm. We are a diverse community with many stories to tell and accomplishments to show.

Finely honed writing is not a requirement. Your editors are here to help with the creation of articles and content. If you have an idea for an article or comment that you would like to contribute, please contact us and let us help you bring it to pass. Let us know what you are doing and what interests you. SEND US PICTURES! A photo essay is the easiest article to create and often is the most entertaining to read. Let's hear from every quarter, from free-flight gliders to racing quads, from giant warbirds to acrobatic helicopters, from rubber power to fuel jets.

Larry Woodward and Dave Harding, Co-Editors

# Membership Renewal For 2018

***Membership renewal for 2018 is now required. You can renew by mail or at the club meeting in January.***

***Don't lose your club privileges!***

***Bring cash or check and your AMA card.***

***Dues are $60.***

Please send a check ***made out to the Propstoppers*** to:

**Ray Wopatek**

**1004 Green Lane**

**Secane, PA. 9018**

Please enclose a ***copy*** of your current A. M. A. Membership card,

***And Please, Please enclose a Stamped self- addressed envelope.***

**Ray Wopatek Membership**

# PropPropstoppers' Drexel University Support Activities 2017/18

By Dave Harding

There are three different aero related activities among the Drexel University engineering students that Chuck Kime and I are supporting currently.

**Aero Design Course:**

The first is the Aero Design course taught by Professor Yousuff. Professor Yousuff has been teaching this course for some years. At the end of each course the students are grouped into several teams of three or four and challenged to design an airplane to a given specification. The first I saw was for a jet airliner to carry twelve passengers five thousand miles. The students use the lessons learned in the course together with their text book; "Aircraft Design: A Conceptual Approach" by Raymer to make such designs and define their characteristics and performance in a final report and briefing.

Two years ago the professor asked Chuck and I if there was a way he could have the students design a model that could be flown and performance measured. The course runs for a typical semester of ten weeks so in that period they would have to learn all the elements of design then in the last few weeks actually build the model. Seemed like an impossible challenge, but Chuck suggested if we designed and built the basic models the students could be challenged to design and build the wings and tails, yielding a stable design that could be flown and performance measured.

Here is the sample airplane that Chuck and I designed and constructed, shown below with wings from an old SAM airplane and tail from some other leftover model parts. These are the parts the students must design and build.

To make things a bit easier we decided to fix the wing chord at 6 inches then proceeded to have ribs laser cut with Clark Y and NACA 6409 airfoils.
In the first class using this approach, summer of 2016 we gave one lecture on the construction with Chuck actually building a wing half during the lecture.

But we all learned insufficient time was allowed for the students to complete the task. This fall the lecture was given by Chuck in time to allow them to actually build their wings and tails. Nine groups did complete them but the day identified for the flying tuned out to be December 5th, the day of our five inch snow storm. Nevertheless the students were required to present their reports and model parts for examination. They had to identify the Neutral Point (key for stability calculations) and the CG, both of which we measured and the professor scored along with their reports.

We, Chuck and I, have kept the wing and tail shown in this picture so we may fly the model and show the students what they might have experienced.

Meanwhile we have realized it is unwise to have this particular outdoor model as the target for the winter semester course and the Professor has asked if we might design and build similar models that could be flown in the Drexel Armory.
But we can continue with the original model if the course is included in next summer's academic calendar and we can fly outdoors, maybe even at CA field.

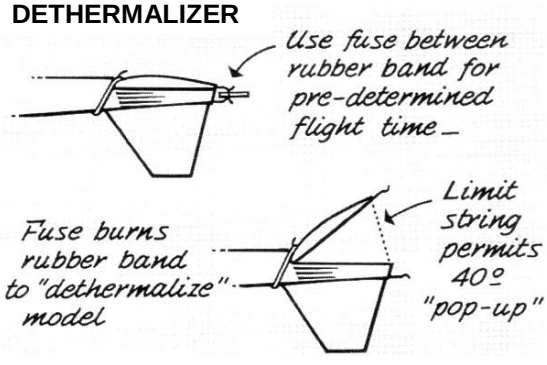
**Lockheed Desert Hawk Landing Study; Deep Stall**

The second team who have asked for support are working on a project defined by Lockheed. They build the military “drone” the Desert Hawk. This is employed in large numbers by the British Army.

This is a four foot span, two pound airplane that is hand launched and belly-lands as we do with our models. There is no landing gear. Experience flying this airplane in “anger” finds the landing frequently results in damage or complete loss. Furthermore, in urban conflict the landing is almost impossible due to space constraints. Consequently Lockheed have challenged the students, a team of five, to examine a “Deep Stall” landing. We old balsa and tissue modelers would have called this “maneuver” a dethermalizing.

Free flight models designed to catch thermals can fly out of sight and out of bounds too easily. So way back in time someone realized if you arranged for the horizontal tail to pop up to a negative incidence of 45 degrees, the model will pitch up once then descend vertically; hopefully landing in the field.

Although this works for our lightly loaded free flight models in this case the vertical rate of descent approaches the normal flight speed. So the problem with this approach for the drone is the sensitive equipment on the underside and how you reduce the impact loads.



Interestingly enough, this same approach is used by Burt Rutan in his Space Ship One, the X Prize winner.

I was amused when observing to Burt that it was a dethermalizer and he strenuously objected. See my article on attending the roll out of the original White Knight and Space Ship One;
http://www.propstoppers.org/pdf_files/may03.pdf
It is also used in the current Virgin Galactic Space Ship Two.

**SAE Aero Design Regular Class**

This is the third activity we are supporting. Another team of five will design, build and fly a twelve foot span model to carry the maximum payload and passengers (tennis balls) with a one kilowatt electric motor.

Here is the team's target competition, the perennial winners of these SAE competitions from Poland.

The competition will take place again in California in early April.

We have supported both Widener and Drexel students flying in these SAE competitions for some years and look forward to getting more involved when this team returns from the Christmas break in early January.

***Dave and Chuck***

# Indoor Electric Modeling

By

Dick Bartkowski

Indoor model flying has several advantages, especially for free flight. We don't have fly-aways or models lost in trees. They are confined to the room and usually accessible even if they hit something. I belonged to a Philadelphia indoor free flight group years ago. We flew at Memorial hall which has a 30 foot ceiling. But, in those days power meant rubber. There was no other choice. I saw a variety of models, some extremely light and flimsy, which could fly for an hour and a variety of other models that flew for a few minutes.

But, to me, rubber had its problems. It took time and patience to wind them. The rubber windings often broke after only a few flights and had to be replaced. This took more time. Power varied with the number of winds as well as the rubber's thickness or length. So, flights varied a lot. When they flew well they were a thing of beauty, but consistency was a problem.

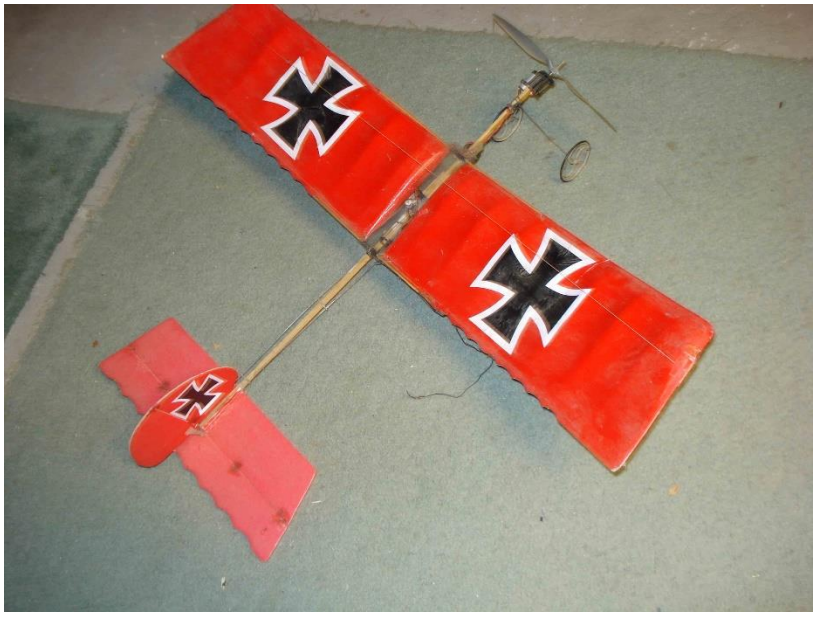
For me, Electric Power has always been a fascination. It is clean, very consistent and reproducible - once it is set up. So, when electric indoor power appeared on the scene, I started in the field and never looked back. The advent of electric indoor began with the availability of small, lightweight Power Systems. Over the last 10 years, smaller lighter Motor Systems became widely available. This was accompanied by new batteries and specific propellers designed for these models. Initially, NiCad cells were used.

I still have two of the 1/3 AAA cells powering my profile P-40. The plane has a Depron foam fuselage and tail but I obtained a commercial foam wing. The body is very light. Even after reinforcing the fuselage with fiber and painting with Magic Markers, the body is only 12 grams. The cells weigh 4 g each and the motor is an N-20 weighing 5 g. This plane could be much

lighter with 3 or 4 g of rubber vs. my power package of 14 g. Still though, the electric is not bad, it flies well indoors. The flying weight of this model is 27 g supported by a 56 square inch wing. The NiCads are 50 mah capacity. To fly they are not charged fully. I use a short charge that limits the flight time to keep it under the ceiling. Initially it climbs and as the battery runs down it cruises then sinks slowly to a landing. Currently there are available NiMh cells of the same size with capacities of 120 to 150 mah that work in the same way.

Click here for P40 flight video

This is a good point to discuss weight for indoor flying. I emphasized light weight for these models. One of the first electric models that a number of us in the club tried for indoors is the Lightstick. It was introduced over 10 years ago. It flew slowly outdoors and was thrown about by any wind. Unfortunately, in the outdoors unless it was calm it could be a handful. Indoors, it flew so fast that we were constantly turning to avoid walls.

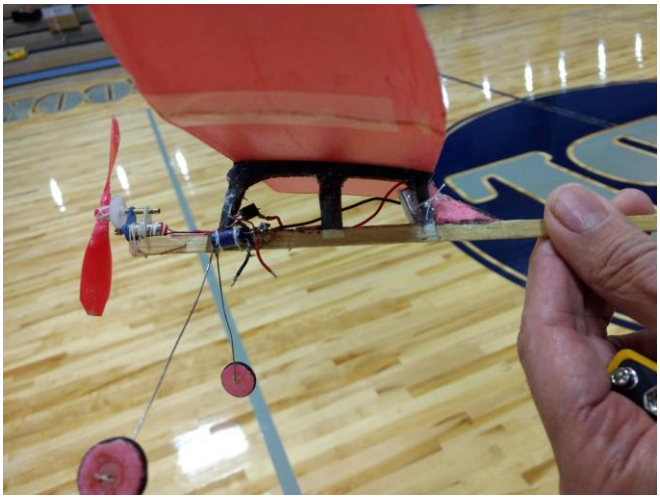


Well, what's going on? This info gives us some idea of what sort of plane will do well indoors. The Light stick comes in at 7 ounces. It has a wing area of 233 square inches. I have a formula I use to calculate the indoor speed. It says that the flying speed is the weight in Grams divided by the wing area square inches (This is referred to as wing loading). Multiply this by 300 and take the square root with a calculator. ( $S = \sqrt{300W/A}$, S=Speed-fps, W=weight-grams, A=Wing Area-$in^2$ ) This formula says that the Lightstick flies at 16 feet per second. Most outdoor planes fly around 30 fps. Sixteen fps is about the upper limit of what is practical indoors. Two popular current indoor models are from Park Zone. These are radio controlled and fly well. The Vapor by the same formula flies at 9 feet per second (16g/56 square inches). Its cousin the foam wing Ember flies at 11 feet per second (20g/50 sq in). The vapor is very

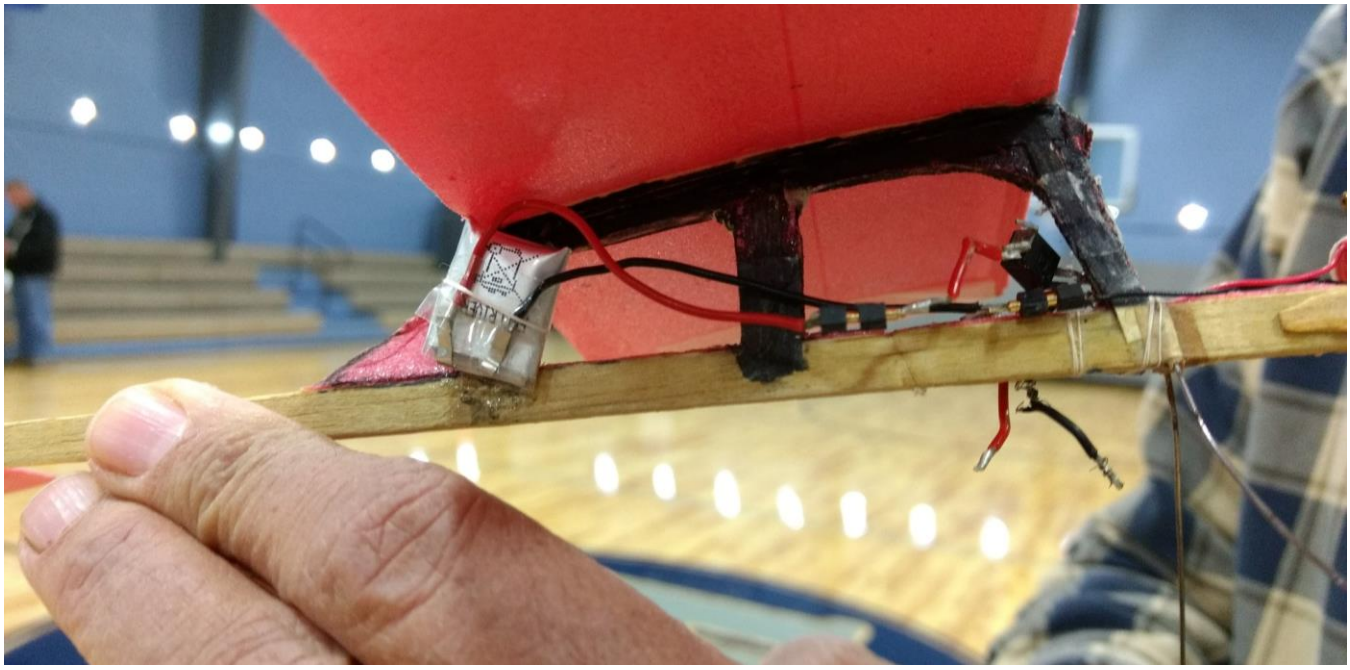
easy flying and the ember is not bad.  So, we have a range to guide our indoor flying.  My free flight profile P40 flies nicely at 11-12 feet per second.

The newer equipment like Lipo batteries, pager Motors, miniature receivers and actuators have made planes like the Ember/Vapor possible.  These have a nice slow flight speed to make flying easier.

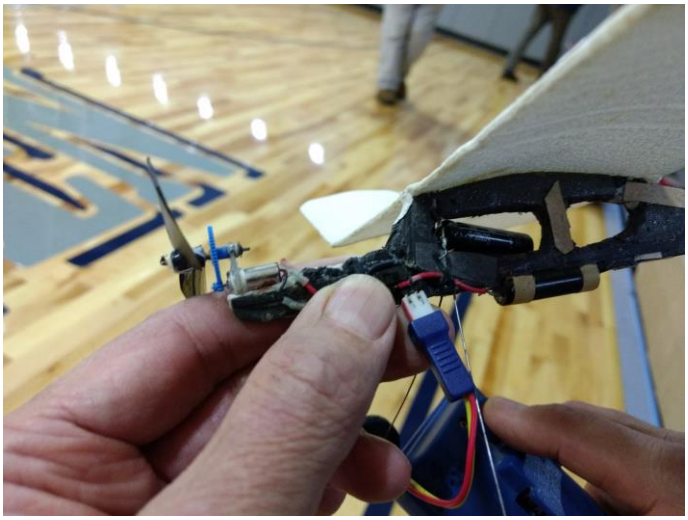
My free flight pink foam flier uses a Postage stamp size Lipo and pager motor to allow a 9 inch wingspan plane to fly well indoors.

**Click here for flight video of the Pink foamy**



Besides Lipo or Nicad/NiMh batteries there is another choice for us electric motorheads i.e. the high capacity capacitor. My black/white flier uses two capacitors to supply power.



While we are used to capacitor measurement listed in microFarads, the new super capacitors have a capacity in Farads. This is a million times greater. It comes with a price though. They are limited to either 2.5 or 3.0 volts. But with some experimentation they can work. The capacitor however has an advantage for free flight. Their natural discharge is a steady drop in voltage. So the plane climbs, then cruises, then sinks - sort of like rubber. When it works well - it produces a very nice flight. And of course the fact that it takes only a few seconds to charge is a real benefit. As with all electrics the flights are very reproducible.

Not all indoor free-flight is confined to ultra light gliders. In addition to the semi scale P40 you saw above, click below to see video of a larger scale model of a twin engine Lancaster Bomber built and flown at one of our indoor flights several years back by Dave Harding.

Click to view Lancaster Bomber Indoor Free-flight video

Indoor electric flight is now a mature area. You can get stuff off the shelf that will fly very well. There are planes, quads and even helis that do well indoors. If you have time and like tinkering with electricity, you can build something in a short time. Trimming and testing will fill up your spare time. Either way it makes for fun flying. Even if you are not so inclined, it is fun to watch all the variety of models that our club flies at our indoor events.

Dick Bartkowski

# New Stealth Drone Has No Moving Surfaces at All

The result is a lighter, simpler, stealthier airplane harder for radar to detect.

BAE SYSTEMS

By Kyle Mizokami
Popular Mechanics Dec 15, 2017

BAE Systems has unveiled a new aircraft design that could be a major advance in stealth technology. The new MAGMA drone does away with aircraft control surfaces, resulting in an aircraft whose shape remains constant throughout its entire flight. The small demonstration aircraft, which has completed a successful first flight, uses blown air to change direction instead of complex mechanical controls.

Most airplanes look unmoving in flight, like a wing hanging off a giant tube plowing through the sky. Look more closely however and you'll see smaller parts of the airplane frequently moving

to control the direction of the aircraft. Conventional aircraft use a system of elevators, rudders, and ailerons to control their direction in the pitch, (up and down) yaw (left to right), and roll directions. These mechanical devices are usually in the shape of control surfaces attached to the rear of the wing, horizontal, and vertical stabilizers and are controlled by the pilot—or sometimes an onboard flight computer.

Control surfaces have been an instrumental part of aircraft since the early 20th century. They're large and heavy, and require a fairly complicated mechanism to move them in mid-flight. These mechanisms can and do fail, limiting an airplane's maneuverability, sometimes with tragic consequences. Among the new generation stealth warplanes such as the B-2 Spirit, F-22 Raptor, and F-35 Joint Strike Fighter, control surfaces can also affect an airplane's carefully shaped stealth profile, as the fin-like device moves upward or downward, momentarily making the aircraft slightly more visible to radar.

MAGMA's innovations could be a fix to both the problem of mechanical complexity and stealth, and accomplishes this by doing away with elevators, rudders, and ailerons in exchange for a system redirected air from the engine and air blowers. The first process, known as wing circulation control, redirects air from the engine moving at supersonic speeds and blows it through the trailing edge of the wing. The second process, known as fluidic thrust vectoring, uses air blowers to change the direction of the aircraft's exhaust.

Combined, both processes allow the pilot to control the direction of the aircraft merely by manipulating the air around it. The elimination of hydraulic controls, replaced with air redirecting ducts and air blowers, will make aircraft with this technology cheaper, easier to maintain, and safer. MAGMA also helps keep the plane stealthy. A pilot or drone operator can change directions without fear that doing so makes his or her plane more visible to radar.

MAGMA's technology is impressive enough to nearly break out the "R" word: revolutionary. That having been said, the tech is limited to a single pilotless drone that has completed a single flight. If the tech is everything BAE Systems claims, the benefits are so potentially so great it should be rapidly implemented on new aircraft designs. Mechanical aircraft controls might have had a good one hundred year run, but maybe it's time for blown air to finally take over.

# Breguet-Richet

By Dave Harding

France, September 1907, and the Gyroplane No. I, a quadrotor built by brothers Jacques and Louis Breguet, lifts its pilot 2 ft. into the air for a minute. But it is unstable and uncontrollable, and steadied by four men on the ground, so is considered the first manned, but tethered, flight.