



# The Flightline



Volume 44, Issue 3    Newsletter of the Propstoppers RC Club    AMA 1042    March 2014



### **President's Message**

It's hard to believe spring is rite around the corner.

The last two indoor sessions are this month the 7th Tinicum and 15th Brookhaven.

Hopefully we can move in to our new meeting room in the Christian Academy building in April. We will have the day and time at the meeting announced on the Propstopper's group and newsletter.

The C/A field is not useable at this time .Please use Elwyn till the ground dries.

Just a reminder; No Aircraft is to be flown at any field without your name and phone number somewhere on the Aircraft. .All models crashing off the fields are to be reported to Al. Cheung 610-742-0605 or Dick Seiwel 610-566-2698 the same day; Bye laws Article 1X number VIII on the club website.

Bring in some show & tell see you at the meeting. We can go over some of the events for this year

**Dick Seiwel, President**

### **Agenda for March 11th Meeting At Middletown Library; Doors open 6:00, meeting at 6:30**

1. Show and Tell
2. Membership Report
3. Finance Report
4. 2014 Event discussion

### **Minutes of the Propstoppers Model Airplane Club Feb 12, 2014**

Eleven members and one guest were present.

Role call was taken and then the treasurer made his report.

### **New Business**

The Library wants to change the evenings that we hold our monthly meeting. Because of this our president asked if the membership thinks we should consider an alternative meeting room. When he was talking to some of the CA church members (they were discussing the possibility of using a section of our field for an Easter Egg Hunt) they said that they had a suitable room available that they would be willing to let us use - at no cost! A motion was passed to authorize Dick to firm up proposals with the church.

### **Show & Tell**

Al Cheung displayed his *Beaver* which he has fitted with skis. He discussed the development of the installation , and advised completing as much of the work as possible in the shop before going to the field because working out in the snow numbs the fingers making it difficult to handle parts.



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### **2014 Indoor Flying Last Two Chances**

Tinicum; Friday March 7, 2014 6:30 – 9:30 PM

Brookhaven; Saturday night 6:30 till 9:30 PM  
March 15 2014

## Calendar of Events

### Club Meetings

#### Monthly Meetings

Second Tuesday of the month.

Middletown Library

Doors open at 6:00, meeting at 6:30 pm.

Next Meeting; 11th March

#### 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.

### Regular Club Flying

**At Old Christian Academy; 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 page 1

### 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

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John Moloko showed his *NitroPlanes Extreme* biplane and he highlighted some of the problems he experienced during the build, and the changes he made to correct them.





Ray Wopatek brought his mini quadcopter but battery problems prevented a demonstration. Flights with his larger version were successful, although it did try to attack him!



Al Tamboro showed his bargain priced strips of LED lights for use on models, complete with strobe electronics .



He also brought along a large *Magnum 18* (28 c.c.) engine .



Mick Harris for Dick Bartkowski, Secretary

## From The Fields

Here is my Stearman PT-17 model on my inaugural flight in January. This is the model that got me started with Propstoppers. My son gave it to me for Xmas 2012 and I joined Propstoppers in January 2013. One year later I finally felt ready to take it into the air. As soon as I finish gluing it back together I plan to take her up again.

*Larry Woodward*



## Lipo Safety and the Darwin Awards

Ryan Schurman posted a video on our Yahoo Group a while back. It was recorded by a fellow who decided to test LiPo Sacks. Many of us expect these containers to protect us against the undesired effects of LiPo battery failures. We use them to transport our fully charged batteries to the field, and return the discharged batteries when done. We also use them to transport batteries that have become damaged in the course of flying events with the expectation that we are protected from whatever may happen with these batteries.

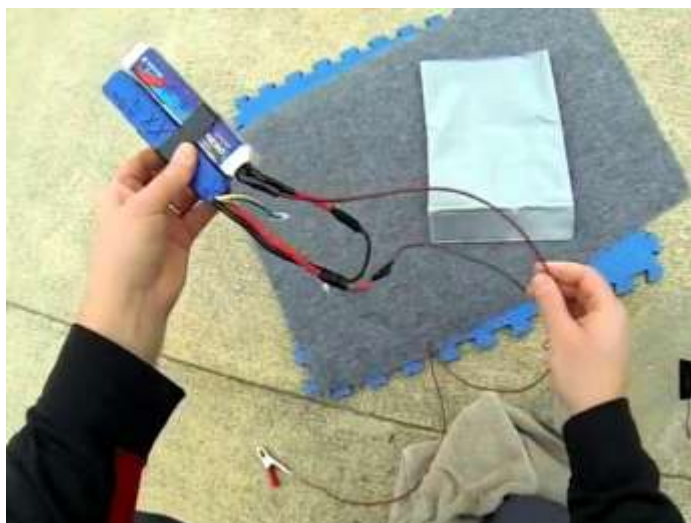
So, do they work? Well the fellow who made the video decided to find out. At least he decided to test the LiPo Sack in several different tests. <http://vimeo.com/m/86301911>

Now this was a good idea, but the fellow seems to have no understanding of electrical circuits, batteries and battery failures. His tests consisted of shorting several different battery packs, and although his methods were crude they do provide some insights, including several beyond his intent or understanding.

Why is he a candidate for the Darwin Awards? Mainly because his almost complete lack of understanding the phenomenon and protections there from leave him vulnerable to serious harm. In the event, he was not harmed, but he could have been.

So what did he do, what was wrong with it, and what did he/we learn?

The first test was using two different four-cell 2650 mAh batteries connected in series and then to two very long fine gauge wires, one with a bare end and the other with a small clamp. These were shorted together in the test. The left hand picture shows the test setup and the right one when the first shorting attempt was made.



Yikes, what happened? Each time he tried to clamp one wire to the bare end of the other there was a spark and the clamp "bit" off the end the bare wire. What is going on here?

Well, two four-cell batteries in series have a nominal voltage of about 30v. The internal resistance of an average 2650 mAh cell is about 0.007 ohms so both batteries in series will have a total internal resistance of about 0.056 ohms. The wire he is using is about 18 gauge and in copper that has a resistance of about 0.007 ohms per foot, so about 0.042 ohms for six feet giving a total circuit resistance of about 0.1 ohms.

Now Ohms law says the current  $A = \text{Voltage} \text{ divided by Resistance}$ , so  $30/0.1 = 300$  Amps for a dead short.

Not surprising with a three hundred amp circuit the clamp burns off the end of the other wire. Hey, you can weld  $\frac{1}{2}$  inch steel plate with 300 amps. Not a very clever experiment, but he did prove Ohms Law.

So, not understanding the nature of what he is doing he proceeds to solve his wire burning problem by putting clamps on each end of the wire and uses a piece of auto jumper cable to make the circuit. Now the nice and fat jumper cable adds an insignificant resistance to the setup so we can ignore that but he is still going to get 300 amps when he makes contact, although the clamp to clamp "join" will not be the weak spot.





This test initially showed a smoke plume escaping from the LiPo Sack. Eventually the smoke died down and the bag puffed. Opening the bag revealed one four cell pack had “destroyed” while the other looked basically intact.

There was no information in this test about the two different packs, although they certainly looked different. So one might reasonably expect that one pack was “better” than the other; probably one had a higher internal resistance than the other with a lower C rating.

Now the basic rating of a LiPo pack is expressed as its C rating, or the continuous current capability. But this is also a measure of the current which will cause the pack to overheat; the primary cause of pack failure under load. There are two factors in play here; the internal resistance that causes the heat and the construction which determines the heat tolerance. I don't know of the construction differences or even if there are any at a given construction era. So the key is almost certainly the internal resistance.



If we were to measure the internal resistance of a 30C pack and compare it to a 60C pack we would expect the latter to have half the internal resistance of the former.

Now the significance to this test is obvious; one pack got MUCH hotter than the other. Indeed the weaker pack reached the melt down state evidenced by the smoke emitted. But the really interesting result is the other pack showed little or no damage. This is an important factor as it shows that a LiPo pack lashed to another which is significantly overheating will not easily catch fire or contribute to the conflagration.

Along the lines of the intention of the tests; the LiPo Sack. The result showed the failure to be contained with little damage to the Sack. Hindsight from the test suggests the battery that failed was almost certainly either a very low C rating or perhaps well used with a low actual capacity.



The next test was with just one four cell pack with thin connecting wires similar to the first test. In this case we might expect the voltage to be 14.8v, the cell resistance to be about 0.028 ohms and the wire as before about 0.042 ohms. So the dead short should result in about 200 amps.



As you can see the immediate result is heating of the connecting wires to the point of burning off the insulation. Two hundred amps through a wire resistance of 0.042 dissipates about 1600 watts ~ your basic electric heater, although they use high temperature nichrome wire! The battery is seeing about 75C discharge rate, but it is not clear for how long as the wires may have melted before the battery was completely depleted. However, it does not appear to have suffered a burn-out failure and the LiPo Sack was completely unharmed; it did the job!

The next test was with three 2200 mAh three-cell packs in series; 9 cells and a nominal voltage of 33v. This time the connection was made directly from the jumper cable to a very short stout battery wire; the wire resistance is negligible. The battery pack resistance should be about 0.063 ohms so the dead short current should be in the order of 500 amps





A fire inside the bag rapidly develops venting out of both sides of the closure flap. It continues to burn for a while whereupon it ignites the mat and pad on which the bag sits. It is not clear how much fuel is contributed by the latter, but eventually the flames and venting smoke subsides whereupon the tester flips the bag over and separates it from the pads. It then reignites and burns again.



Again the three packs sustained different damage. One is completely destroyed, the second shows cells separating but the third shows the pack largely intact. Discussions the other day on the Rose Bowl Lawn with an F5B flyer indicates they sometimes have problems with the solder connections to the battery cells melting. Remember, these guys pull 200 amps but only for a few seconds at a time. Nevertheless, it is heat we are talking about here and as things heat up it is the weakest link that starts the problems. If a cell connection melts the circuit connection is broken and the pack no longer generates heat, unless it is already “burning”. So you can see in a multi pack battery one pack can go into thermal runaway while another separates electrically while sharing the same space.

Still the energy released with low resistance wire connections was substantial and resulted in complete destruction of the LiPo Sack. However, I doubt that those using multi pack batteries leave them plugged together once back in the Sack. So we are back to the question of a single pack shorting as the primary heat generator. These tests show other packs may not kick off by just being adjacent in the same sack. Further, to make a single pack melt down the sack you must have a dead short with a low resistance. Just touching loose connectors wouldn't do that.

Then there is the question of damaged batteries; those with impact damage to one or more cells. Can that kind of damage cause the “dead short” kind of energy release with the subsequent fire? I don't know, do you?

But the tests do once again raise the question of how best to protect against the possibilities of LiPo battery fires, in the shop, in the car and at the field. Ammo cans anyone?

Oh, why did I propose the tester for a Darwin Award? Look at his footwear while doing these tests. Worse, he stamped on the final three three-cell test bag while it was still burning.



Dave Harding

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## **Travelling with LiPos and Other Hazardous Materials**

As most of you know I travel often to the US west coast and less frequently to Europe to fly models. Recently, well, for some time now, there have been emerging rules regarding transporting LiPo batteries. Currently, so to speak, flying with LiPos is covered by TSA regulations. Taking LiPos in your checked baggage is prohibited, but you are allowed to transport them in your carry-on bag. The rules include a limit on capacity but it would appear they have been written specifically for large batteries used in video equipment etc. although I did read something on RC Groups that would suggest the larger packs some of us now use may fall into this category. Here is the rule;

*Effective January 1, 2008, you may not pack [spare lithium batteries](#) in your [checked baggage](#).*

*You may pack [spare lithium batteries](#) in your [carry-on baggage](#). Please see our [Spare Battery Tips](#) and [How-To](#) sections to find out how to pack [spare](#) batteries safely!*

*If you pack a [device](#) containing batteries, secure it against activation by locking the activation switch in the "off" position, placing the device in a protective case, or by other appropriate measures.*

*For personal use, there is generally no restriction on the number of [spare](#) batteries allowed in [carry-on baggage](#). This is the case for cell phone batteries, "hearing aid" button cells, and AA/AAA batteries available in retail stores, as well as almost all standard laptop computer batteries.*

*See "[Larger Batteries](#)" to find out about more powerful batteries, such as extended-life "universal batteries" and batteries designed for professional audio-visual applications.*

*["Larger" lithium ion batteries](#) are rated between 100 and 300 [watt-hours](#) (8-25 g [equivalent lithium content](#), or [ELC](#).)*

*Note; a six cell 5000 mah pack is 111 Watt-Hours*

Last fall Dick Bartkowski and I flew in the SAM Champs in Boulder City Nevada shipping most of our models via Greyhound in a large box. Greyhound does not seem to have specific rules on LiPo batteries so it has not been an issue. Indeed they don't seem to examine what is in the box, unlike their TSA "cousins" who regularly trash my models that accompany me by air. However, this year I needed some new batteries and since most of our events allow or require multiple flights on the same day and we usually fly when the weather is best, we need sufficient batteries to make these multiple flights without recharging. Therefore my purchase was for multiple sets delivered to the west coast.



Now as you also know I usually fly in the Arizona desert in January so this year we decided to leave our SAM Champs model box in California so my models were in place. I shipped them back east after the meet. However, I did not ship my new LiPos in the box and also removed Dick's "heavy" bag so as to minimize possible model damage if the box were thrown around. Turned out Dick's LiPos were in that bag so I was faced with flying back with multiple LiPos. Here is my pack all taped to a cardboard sheet to keep them oriented and secure in the LiPo Sack. There was no room for Dick's batteries in the Sack so I simply stashed them in the same carry-on bag in the plastic lunch bag.

Remarkably, once again the bag with the LiPos went through the airport security screening with no alarms, no interest. Don't know how much longer this will be the case, what with all the publicity from Boeing's problems but I have my fingers crossed.



However, traveling with engines is another matter. A couple of years ago I built an Old Timer during my stay in California. It was built around a 1930s Brown Jr. Ignition engine, one that was given to me by the previous year's Champion. On my return journey I packed the partly built model in my trusty golf bag to ship as luggage including the engine and another Ohlsson 60 ignition too. My daughter drove me to Burbank airport and dropped me curbside for my flight an hour hence. But as I checked the golf bag the agent asked me what was in the box. I explained it was a model airplane. He then asked if there were any engines there too. Of course I showed him the engines whereupon he asked if they had ever been run or "seen" fuel. I said probably but maybe not for sixty years. He replied that it didn't matter when but if they had ever seen fuel they were prohibited from the luggage, checked or carry-on. Yikes, what to do? \$400 worth of engines and a flight an hour away, and no way to mail them. Fortunately I was able to recall my daughter who returned in time to take them for subsequent mailing. I now mail my engines before and after the meets.

While in California I broke-in the Brown after a ring job by the "Ringmaster" from New Mexico. West Coast eating, drinking and flying buddy Mike Myers has the permanent test site in Peenemunde, just behind his house in the Verdugo Hills. Mike's shop consumes every part of his three car garage. The open doors face south high above the Los Angeles basin, great weather, great views, quiet cul-de-sac, great neighbors and close to excellent watering holes☺.



By the way, the test site was further up the wash but the recent incidence of mountain lions eating dogs caused the move closer to the escape route.



We broke-in the Brown there (partly as an excuse to sample the micobrews at the Golden Road brewery).  
Yep, mailed them back ahead of our return and they arrived the next day; Yippee!



Meanwhile, seen at the Rose Bowl lawn during a prior flying to justify eating and drinking occasion we saw the following fellow flying is RC Groups F-117, a hot handful. While there another group of regulars flying quads told me about the marker on the site recording the first flights there of Paul MacCready's prototype of his original man powered airplane; The Gossamer Condor



**Dave Harding**

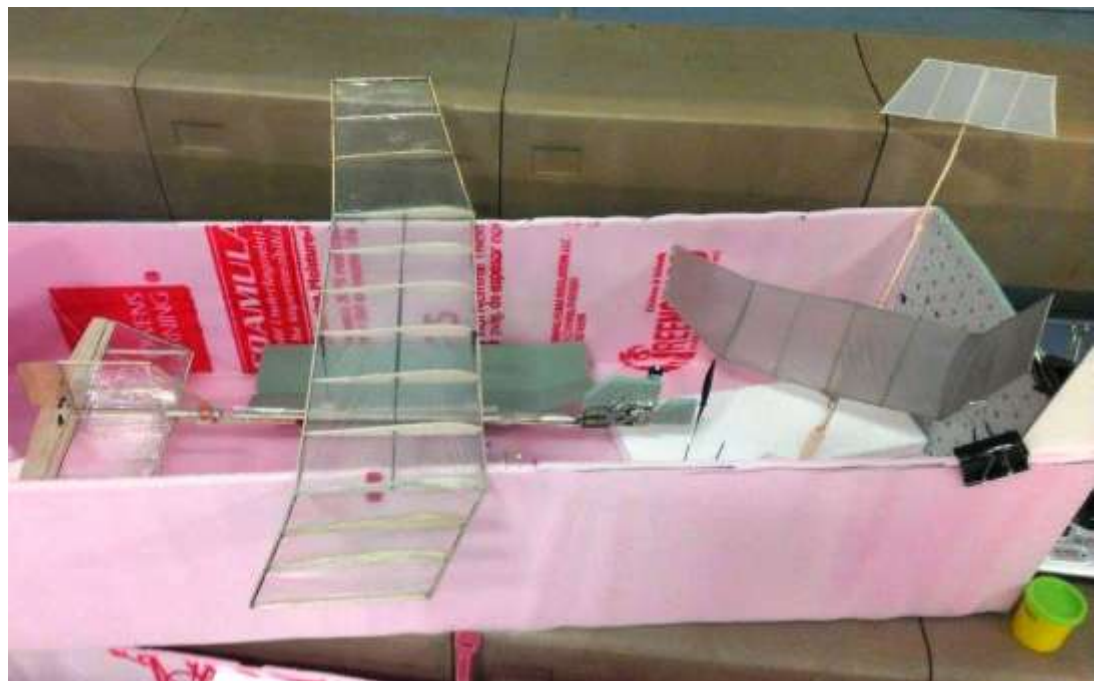


## Brookhaven Indoor 14<sup>th</sup> January



Turnout was a little light at 9 pilots. But as you can see in the pictures, all came with multiple planes. Of course, snow and cold temperatures didn't help any. Just getting from the car into the building was a chore. The parking lot was like a skating rink. And leaving was even worse. But HEY!!, we came to fly, and fly we did.

The first 3 pix are of Larry Woodward's Latest experiments.







He has been flying what appears to be a small rubber model. He uses a small motor capacitor/motor assembly that was designed to fly paper airplanes.

It still needs a little work, but it's close. That inspired him to step up to something larger. He doubled the size, and put in the RCVR block from a Vapor/Ember. It flew, still needs trimming but, it flew.

His other plane was a pink foamy conceived from an idea he got online. It does fly but a little heavy, and fast for indoor.

The next 2shots are Chris flying his 3-D plane At times there were as many as 6 models in the air.







The next shot is a reminder of when everybody had Air Hogs. It flies with the same power as the Air Hogs: two motor differential thrust steering, but not quite as powerful. Oh, that's not trick photography. That's really my hand.

Al Kozloski, and his son Josh are getting a handle on it. Another indoor or two and they should have it.

Next shot is Ray Wopatek's Quad. After trying to raise the ceiling and widen the hall a few times, it flew great. No, it didn't shrink. Ray also flies a smaller Quad.







Several of the flyers left a little early, about 8:45, so I opened the floor to all classes. While the only one flying the larger foamies was Larry Woodward, everyone seemed to be Okay with the shortening of flight sessions from 15 min. to 12 min. Here is a video put together by Larry's friend Pedro Navarro [http://www.youtube.com/watch?v=1jwcmC\\_ljxl](http://www.youtube.com/watch?v=1jwcmC_ljxl) and here is another video from the January Brookhaven Indoor. [http://www.youtube.com/watch?v=1jwcmC\\_ljxl](http://www.youtube.com/watch?v=1jwcmC_ljxl)

What can I say? A good time was had by all!

Thanks to Brian Williams for the photos.

**Chuck**



## ***Busting Myths about the FAA and Unmanned Aircraft***

Jeff Frazier brought this article to our attention. It is from the Small Unmanned Aerial Systems (sUAS) organization's website; <http://www.suasnews.com/2014/02/27738/busting-myths-about-the-faa-and-unmanned-aircraft/>

**February 26**—There are a lot of misconceptions and misinformation about unmanned aircraft system (UAS) regulations. Here are some common myths and the corresponding facts.

### **Myth #1: The FAA doesn't control airspace below 400 feet**

Fact—The FAA is responsible for the safety of U.S. airspace from the ground up. This misperception may originate with the idea that manned aircraft generally must stay at least 500 feet above the ground

### **Myth #2: Commercial UAS flights are OK if I'm over private property and stay below 400 feet.**

Fact—The FAA published a Federal Register notice in 2007 that clarified the agency's policy: You may not fly a UAS for commercial purposes by claiming that you're operating according to the Model Aircraft guidelines (below 400 feet, 3 miles from an airport, away from populated areas.) Commercial operations are only authorized on a case-by-case basis. A commercial flight requires a certified aircraft, a licensed pilot and operating approval. To date, only one operation has met these criteria, using Insitu's ScanEagle, and authorization was limited to the Arctic. (<http://www.faa.gov/news/updates/?newsId=73981>)

### **Myth #3: Commercial UAS operations are a "gray area" in FAA regulations.**

Fact—There are no shades of gray in FAA regulations. Anyone who wants to fly an aircraft—manned or unmanned—in U.S. airspace needs some level of FAA approval. Private sector (civil) users can obtain an experimental airworthiness certificate to conduct research and development, training and flight demonstrations. Commercial UAS operations are limited and require the operator to have certified aircraft and pilots, as well as operating approval. To date, only two UAS models (the Scan Eagle and Aerovironment's Puma) have been certified, and they can only fly in the Arctic. Public entities (federal, state and local governments, and public universities) may apply for a Certificate of Waiver or Authorization (COA). The FAA reviews and approves UAS operations over densely-populated areas on a case-by-case basis. Flying model aircraft solely for hobby or recreational reasons doesn't require FAA approval, but hobbyists must operate according to the agency's model aircraft guidance, which prohibits operations in populated areas.

### **Myth #4: There are too many commercial UAS operations for the FAA to stop.**

Fact—The FAA has to prioritize its safety responsibilities, but the agency is monitoring UAS operations closely. Many times, the FAA learns about suspected commercial UAS operations via a complaint from the public or other businesses. The agency occasionally discovers such operations through the news media or postings on internet sites. When the FAA discovers apparent unauthorized UAS operations, the agency has a number of enforcement tools available to address these operations, including a verbal warning, a warning letter, and an order to stop the operation.

### **Myth #5: Commercial UAS operations will be OK after September 30, 2015.**

Fact—In the 2012 FAA reauthorization legislation, Congress told the FAA to come up with a plan for "safe integration" of UAS by September 30, 2015. Safe integration will be incremental. The agency is still developing regulations, policies and standards that will cover a wide variety of UAS users, and expects to publish a proposed rule for small UAS – under about 55 pounds – later this year. That proposed rule will likely include provisions for commercial operations.

### **Myth #6: The FAA is lagging behind other countries in approving commercial drones.**

Fact – This comparison is flawed. The United States has the busiest, most complex airspace in the world, including many general aviation aircraft that we must consider when planning UAS integration, because those same airplanes and small UAS may occupy the same airspace.

Developing all the rules and standards we need is a very complex task, and we want to make sure we get it right the first time. We want to strike the right balance of requirements for UAS to help foster growth in an emerging industry with a wide range of potential uses, but also keep all airspace users and people on the ground safe.

### **Myth #7: The FAA predicts as many as 30,000 drones by 2030.**

Fact—That figure is outdated. It was an estimate in the FAA's 2011 Aerospace Forecast. Since then, the agency has refined its prediction to focus on the area of greatest expected growth. The FAA currently estimates as many as 7,500 small commercial UAS may be in use by 2018, assuming the necessary regulations are in place. The number may be updated when the agency publishes the proposed rule on small UAS later this year.

You can catch up with exactly what's happening with airspace integration at our show in May. Jim Williams will be speaking <http://susbexpo.com/speakers-2014/>. Jim Williams is the Manager of the FAA's Unmanned Aircraft Systems (UAS) Integration Office. This office functions as the single agency focal point for all UAS-related activities and is uniquely positioned to develop and coordinate solutions to UAS challenges across the FAA and with external organizations.

## Widener University SAE Aero Design 2014 Progress

As most of you know Propstoppers Dave Bevan, Chuck Kime and your editor Dave Harding consult with the Widener University SAE Aero team each year. This year the rules were changed so instead of using an OS 61 glow engine they must use an electric motor. The choice of motor is open but the ESC must be fitted with a Neu Power Limiter which will limit the power to 1000 watts. They also specify a four-cell 4400 mah LiPo battery so the motor will pull about 70 amps. The team has been running MotoCalc as part of their design process, and have selected a Neu 1527/1D motor with the 6.7: 1 gearbox. It turns out that props in the order of 22 x 14 seem to give the best performance.

The challenge is to takeoff within 200 feet and fly with the maximum payload. Extensive analyses are being conducted to determine the maximum weight. Currently it is in the 45 to 50 pound range.

The rules require the model span + length + height to be less than 175 inches. The team's design has a 102 inch span and 14 inch chord wing with the highly cambered Selig S1223 airfoil.

The team is using a Spektrum DX7S transmitter and between us we have the necessary components to incorporate telemetry for airspeed and altitude and the Castle Creations 100 amp ICE ESC also includes data logging. It should be interesting.

On Tuesday the model had reached the point where the initial taxi test could be conducted. This was done with only the wing center section in place



Further taxi tests with the full wing are planned for the rest of the week, perhaps in the Widener field house. Flight testing will begin shortly thereafter but the location has not yet been determined.

**Dave Harding**



## **34TH ANNUAL Lebanon, PA RC FLEA MARKET. 3/8/2014**

Sponsor: CENTRAL PENN AEROMODELERS

Site: Lebanon Expo 80 Rocherty Rd. Lebanon, Pa.

Larry Leiphart CD PH: 717-412-8579 Email: info@cpaa.us.  
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Visit our website at [www.cpaa.us](http://www.cpaa.us)

### 34th Annual Radio Control FLEA MARKET

**PLACE:** LEBANON FAIRGROUNDS  
80 Rocherty Road  
Lebanon, PA 17042

**DATE:** SATURDAY March 8, 2014  
(Regardless of Weather)

**TIME:** 8:30 A.M. for General Admission  
7:00 A.M. for Members Only  
Open 'Til 3:00 P.M.

For table availability  
e-mail [info@cpaa.us](mailto:info@cpaa.us)  
Advance general admission  
tickets available at \$7.00  
each (non-refundable)

Space  
Reservations and  
Advance tickets  
Recommended

For advance tickets visit  
our website and check  
(payable to CPAA) to:  
CPAA  
139 Lee Ann Ct.  
Enola, PA 17025

Admission: \$8.00 (Donation of your choice \$2.00)  
Aisle Spaces: \$15.00 each (2 ft. long)  
Wall Spaces: \$20.00 each (3 ft. long)

For Information: Call Larry (717) 412-8579  
or email [info@cpaa.us](mailto:info@cpaa.us)

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...featuring: Radio Controlled airplanes, Sailplanes, cars,  
boats, control-line airplanes, and related accessories.

## **Membership Renewal For 2014**

*Membership renewal for 2014 is now required. You can renew by mail or at the club meeting in March.*

*Don't loose your club privileges!*

*Bring cash or check and your AMA card.*

*Dues are \$60.*

Please send a check 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**

**No Membership = No Flying  
You have been warned**