

Newsletter of the Jet Pilot's Organization

# *Contrails*

Spring 2014

Volume 26, Issue 2



Brian O'Meara's Skymaster *Cougar* coming  
in for a landing at Desert Jet Storm.

Greg Moore Photo



President's Report

Keith Sievers

This will be my last column as President of the JPO. After several years at the helm of the organization, it is time to seek new leadership for the organization. I have always believed a change of leadership every few years in an organization like the JPO is healthy as it brings in new perspectives and energy. As I retired and moved away from the Florida area, my jet flying and attendance at jet events has declined, reducing the visibility of the organization. I will stay involved with the JPO as the AMA liaison, hopefully leveraging my relationships with the leadership of the AMA

and my involvement with the safety committee for the good of the organization.

The JPO is currently looking for a new President, so if you have a passion for the hobby and a desire to lead, please contact me at pilot114@aol.com to discuss the needs of the organization further.

As you will read in the District columns, we have several new officers on board. We are also working on a formal set of objectives for the organization, and assuming we can find volunteers to help us, there are several ideas in the works that will hopefully bring some new events to the calendar and improve the visibility of the JPO.

Thanks to all of you for your support, and to the dedicated officers who have and continue to devote their time and efforts on your behalf to the JPO.

Keith

Upcoming Events

**Rocky Mountain Jet Rally (early edition):** June 13-15, 2014  
Love Air R/C Field, Fort Collins, CO  
<http://loveairrc.org/>

**Hotter than Hell Jet Rally:** June 19-21, 2014  
Bomber Field, Monaville, TX  
[www.bomberfieldusa.com](http://www.bomberfieldusa.com)

**OC-Turbo Fest-Early Summer Edition:** June 20-22, 2014  
Titusville Airport; Titusville, PA  
[jacknbets@aol.com](mailto:jacknbets@aol.com)

**Idaho Jet Rally:** June 20-22, 2014  
TVA field in Parma, Idaho  
[www.flytva.blogspot.com](http://www.flytva.blogspot.com)

**Jets over the Heartland:** June 25-29, 2014  
Winamac, IN  
[http://winamacaeromodelers.com/whats\\_new.html](http://winamacaeromodelers.com/whats_new.html)

**Jets over Kentucky:** July 6-13, 2014  
[www.visiblebanonky.com/events/kyjets.htm](http://www.visiblebanonky.com/events/kyjets.htm)

**Highland Jets:** July 18-20, 2014  
Frankfort Highland Airport, Frankfort, NY  
<http://mvfirebirds.com>

**Wingham Jets:** July 25-27, 2014  
Wingham, Ontario, Canada.

**Hamburg Summer Afterburner:** July 31-August 3, 2014  
Hamburg, PA  
CD: Erik Rudjord (610) 554-7455

**Burt Eisenberg Memorial Charity Jet Fly:** August 7-10, 2014  
Grosse Ile, MI  
[www.michiganjets.com](http://www.michiganjets.com)

**Alberta Jets over Tofield:** August 8-10, 2014  
Tofield Airport, Alberta, Canada  
[www.rccanada.ca/rccforum/showthread.php?t=220689](http://www.rccanada.ca/rccforum/showthread.php?t=220689)

**Jets over the Valley:** August 15-17, 2014  
Night Hawks RC Club, North Jackson, OG  
[www.nighthawksrc.com](http://www.nighthawksrc.com)

**New England Jet Rally:** August 15-17, 2014  
Gardner Municipal Airport, Gardner, MA

**Midwest Jet Rally:** August 22-24, 2014  
New Hampton, IA Municipal Airport  
CD: Jerry Crow  
[ddennison@yahoo.com](mailto:ddennison@yahoo.com)

**Jets over Whidbey:** August 22-24, 2014  
Whidbey Island, WA  
[www.jetsoverwhidbey.com](http://www.jetsoverwhidbey.com)

**Pine Hill Jet Rally:** August 22-24, 2014  
Albion, NY  
[www.pinehillrc.com](http://www.pinehillrc.com)

**Greater Southwest Jet Rally:** September 4-6, 2014  
HOTMAC Club Field; Waco, TX.  
[www.hotmacrc.org](http://www.hotmacrc.org)  
[garrettlarryd@aol.com](mailto:garrettlarryd@aol.com)

**Route 66 Jets:** September 4-7, 2014  
Litchfield, Illinois Municipal Airport  
CD: Jerry Crow  
[www.route66jets.com](http://www.route66jets.com)

**Maine Jet Rally:** September 7-10, 2014  
Sanford Airport, Sanford, Maine  
CD: Ray Labonte (207) 797-5196

**Super Jets South:** September 26-29, 2013  
Gay, GA  
[www.georgiajets.org](http://www.georgiajets.org)

**Hamburg Jet Jamboree:** October 2-5, 2014  
[www.farviewflyers.net/racerxx@ptd.net](http://www.farviewflyers.net/racerxx@ptd.net)

**T-38 Jet Rally:** October 3-5, 2014  
Lubbock, TX

**Best in the West Jet Rally:** October 15-19, 2014  
CD: Joe Castelao  
Buttonwillow Elk-Hills airport, Bakersfield, CA  
[www.bestinthewestjetrally.com](http://www.bestinthewestjetrally.com)



## Vice President's Report

Lance Campbell

Before I move on to the regular column you're used to reading, I have a bit of news for you. I've decided to step down as your Vice President of JPO.

My tenure has been four years as your District VI rep, and about a year and a half as your VP, and I have thoroughly enjoyed representing all of you in our national organization.

Unfortunately, life on the home front has gotten increasingly busy, and I find myself not having the time to do the organization justice. My two boys are now 8 and 10, and with an increasing pace of school and activities, along with a wife who has a career that is taking off, requiring more time as well, there are only so many hours in a day....

I will continue to be a JPO member for ages to come, as I think the work the organization does is invaluable to keeping our interests protected and pressing for change, when able, during these challenging times. Also, I'd like to take this time to tell you that the effort that the rest of your officers do for JPO is really great work. It's often unseen or unnoticed, but on many occasions it has helped keep our jet flying running smooth for the rest of us, and for that I'd like to thank them for their contributions over the years.

As I prepare to depart this desk, I'm pleased to tell you that Jim McEwen will be assuming this position within the organization. I've known Jim for years, and he will be a great asset to everyone here, with his extensive depth of knowledge in both r/c jets and full-size aviation engineering. Congratulations Jim!

Now, on to our regular column for this issue: *Gyros*.

WAIT! I see you already turning the page....get back here!

For years I blew off the use of them, figuring they were an unneeded toy, and/or a patch for a poor setup or design. But, I had reason to reconsider their use, after flying my scratch-built SR-71 *Blackbird* a couple seasons.

The plane was already flying great, but I got to thinking that if I ever were to have an engine failure or issue, perhaps a gyro could help keep the plane stable so that I could get it back on the ground. Consider it an insurance frame of mind.

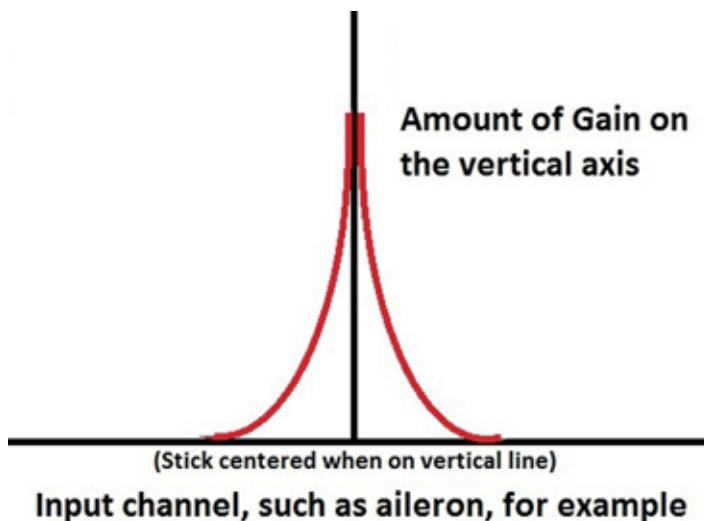
After I got the gyros dialed in, it went from flying great, to unbelievably stable - all of the time. Here are the steps I went through, and which would work for anyone going about setting up gyros in any plane, especially those unfamiliar with what they can do for you.

The gyros I used are built into a Weatronics receiver, but this approach would apply to many of the makes and models of gyros out there today. A key facet to their implementation was to do no harm along the way!

As part of your setup, you need to take extra care that what you're doing really IS what you think it is. Gyros set up incorrectly can crash a plane, so take your time. When I was done, this process took 15-20 flights to get them really dialed in, but it was time very well spent. Also, do this just one axis at a time! Here are the steps that I went through:

**Step 1.** Figure out a way, or select a channel, to be able to 100% turn off the gyro axis that you are working on. I set up the gain on a slider so that sliding it all the way to one side set it to 0% gain, effectively turning it off for the test flight phase.

**Step 2.** This is a matter of preference, but I wanted to set a mix so that the gyro would be most effective when my stick was centered, and drop out of the way when I moved the stick off center. Say you get 1/3 of the way out from center and the gain is mixed all the way off, but the center still has the most gain you desire. The shape of this "V" mix will, of necessity, vary based on your preference.



The result of this, is that when you're doing your normal pattern flight with minimal stick movements, the gyro is stabilizing out all of the turbulence; but when you want to bank harder, do a roll or aerobatics - the gyro steps out of the way and lets you do your thing without having to flip buttons or switches.

**Step 3.** Ground setup. This is where you're setting up the direction of the gyro's help and literally which servos it will be moving. Let's say you are setting up roll: get it in your head that when you bank the plane by hand in one direction, know which way the gyros should move the servos to correct that roll BEFORE you touch the plane. This will help

you to not confuse yourself by thinking you're seeing it do it correctly, when it's actually doing it backwards. Then have a friend confirm what it should be doing as well, since setting this up backwards is just as devastating as hooking up your ailerons reversed, and trying to fly it that way. To reiterate: if you roll the plane to the right in your hands on the ground, the ailerons should correct this movement with a left turn. Also, to help visualize this during setup, turn the gain up to 100% for a few minutes so that it's exaggerated, making it easier to see the correction.

**Step 4.** Pull your slider so the gain is 0%, and start a test flight. As you fly, slowly add in the gain a few percent at a time with the slider. The point you are trying to reach is where it's a nice help to you, but not stepping on your toes and fighting you. Also, there is an upper limit you must be very careful with as well. Set the gain too high, and you can induce flutter in that surface as the gyro is too aggressively trying to correct itself. If you just crank it way too high, it could literally tear off the surface in a matter of seconds. I would do a couple of laps at max flying speed, and have two spotters watching the plane with me to see if any of us could spot any slow oscillations, indicating we were getting close to the max gain for the setup. If all looked good, increase the gain a few more percent with the slider, and do a few more laps. Repeat until either: (a) you're content with the corrective behavior of the gyro, or (b) you've started to see a slow oscillation. If you see that, immediately throw the slider to 0% gain, and slow down. You've just found the upper limit. Now set your gain a little below that and remove it from the slider since your "testing phase" for that surface is complete.

**Step 5.** Now, with the desired amount of gain set, you can tweak the "V" mix we ballparked in Step 2 for doing the test flights. Maybe you want it to step out of the way a little quicker, or perhaps you don't fly that many aggressive aerobatics and you want it to be a broader "V", keeping the gyros in the picture longer as you move your stick off-center.

Personally, all of this effort paid off last year at Jets over Kentucky on my SR-71. On my third flight, the gyros jumped in with both feet to help stabilize the plane when I had an engine problem. The left engine shed part of its compressor blades, but kept running, putting out about half its thrust while making an unusual sound. The gyro on the rudders, jumped in automatically, and kicked in about a 20 percent deflection. They were working so well, I landed the plane without a scratch, and could barely tell something was amiss. It was only after I got to looking at the logs in the Weatronics receiver did I realize the extent that they helped keep the plane stable, while I landed quickly.

You don't need to be flying a twin with engines far apart to appreciate the benefits of a set of gyros being dialed in. Maybe the wind kicks up on you mid-flight, or switches to a bad direction and starts gusting just as you turn onto final for landing. Either way, the time spent to get this technology setup can really enhance your flying experience, yet not get in the way of whatever flying style you enjoy.

Thanks again for your support over the years, and it has been my privilege to represent you in our organization.  
Lance

**Treasurer's Report**

<b>Balance as of January 1, 2014:</b>		<b>\$2,935.35</b>
<b>Income:</b>		
Dues - Cash/Check:	\$650.00	
Dues - PayPal:	\$1,603.74	
Log Book Sales:	\$10.00	
<b>Total Income:</b>		<b>\$2,263.74</b>
<b>Expenses:</b>		
Canadian Exchange Fee:	\$5.99	
Postage:	\$178.90	
<i>Contrails</i> :	\$1,263.53	
Internet Service/website:	\$89.55	
Conference Call:	\$145.56	
<b>Total Expenses:</b>		<b>\$1,683.53</b>
<b>Account Reconciliation:</b>		
Checking Account:	\$3,396.79	
Paypal Account:	\$68.77	
Cash/Checks on hand:	<u>\$50.00</u>	
	\$3,515.56	
<b>Ending Balance as of march 31, 2014:</b>		<b>\$3,515.56</b>



## District III Report

Mark McCracken

Ohio  
Pennsylvania  
West Virginia

For the majority of us in the Northeast the snow is finally, just about gone. Most years, there has been some jet flying during the winter months, but this has been one of the hardest, coldest and longest winters we have seen in a very long time - so not much in the way of flying. With warmer temperatures slowly crawling in, most of us have (finally) had a chance or two to blow the dust off our jets and get some flying in.

As the 2104 season for us is just getting underway, I have listed a few upcoming events in District III.

-June 20 - 22: Titusville, PA. Summer edition of OC-Turbo Fest.

-July 31 - August 3: Hamburg PA. Afterburner Jet Rally

-October 2-5: Hamburg PA. Farview Jet Rally.

In the next issue of *Contraails*, I will post the results from my search for a small, portable generator.

I am searching for the best bang for the buck, but at the same time looking for good quality, reliability, and most importantly, how quiet they can be. I was really surprised at just how many gas-powered inverters are out there on the market for purchase.

Most of us know the top sellers are Honda followed by Yamaha. But I believe the Ryobi 2200 is a close third (but certainly in the top five of portable generators). These findings on the generators are just my opinion and not scientific results of any kind. In the next issue I will post available models, the difference in cost, db's and some of their pros and cons.

I just purchased a DX-9 talking radio. I have not flown anything using it yet, but I love some of the features. So far, during set up I have come to really like the talking timer. No more having to look down or have my spotter look at the timer to see what time I have left before setting up for a landing. Did I mention that I REALLY like the talking timer?

Besides the generators in the next issue, I will share my set-up experiences with the DX9.

Mark

## Member Photos



Larry Wright poses with his Pilot's Choice winning, scratch-built FJ-1 Fury at the Farview Flyers Jet Rally.

District VIII Report

Ron Schwarzkopf



Arkansas  
Louisiana  
New Mexico  
Oklahoma  
Texas

Hello again from District VIII! I have been busy for the last several months putting together a shop for building my model stuff, so I have not been doing much building lately. This shop project has been going on a bit longer than I had hoped for, but I think the end is nearing.... Also, a work trip cancelled my planned travels to Tucson for their March jet fly, and then, another family trip kept me from traveling to Houston for another jet fly ... so I'm off to a slow start and full of excuses for my model jet flying season.

Mississippi Afterburner

Well, finally the excuses cleared, and I was able to travel a few miles east to the Mississippi Afterburner Event. We also got lucky - the weather was a vast improvement over last year's unusual cold rain and wind. This time around, we had warm temps, clear skies, and wind actually blowing down the runway! Vern Montgomery's event attracted about 70 registered flyers to the John Bell Williams Airport. Many spectators turned out, along with lots of help from the local model and full-scale aviation community. Attendees also got the bonus of seeing a full-scale MiG-15UTI (Russian 2 seat trainer) fly in for a few days, flown in by Bill Culbertson - also an r/c jet modeler. I have seen several MiG-15s up close at museums, but have never seen a flyable version, so I really appreciated seeing the demo flights!

Several models flew very well at the event, including Kevin Whitlow's *Avanti S*, James Smith's Union Jack *Hawk*, Craig Gottschang's large *Futura*, and several others. Global Jet Club reps attended and flew a Hawker *Hunter* very consistently. Two of the old PCM Models L-1011s attended, flown by Bob Price and Scott Harris - nice to see a few commercial airliner types flying at the event. Saturday night, we were all fed 'til we were stuffed with crawfish, more fish, and a big ol' pig with all of the sides - and then came the ice cream! The Saturday night tradition continues! A big thanks goes to Vern Montgomery and the Mississippi Gang for making it happen again! Photos of the event follow, with some of them from James Smith. Thanks James!

Future District VIII Jet Events are:

- May 15-17: Texas Jets, Mt Pleasant, TX, Gus Hudson CD.
- June 19-21: Hotter than Hell Jet Rally, Monaville TX, Bob Brubaker CD.
- September 4-6: Greater SW Jet Rally, Waco, TX, Larry Garrett CD.

This year we have a bit of shuffling going on with jet flys... The Austin, TX event will not be happening, so the Houston area is stepping it up this year to fill the void. I plan to make it to the Monaville event (I've never flown at Bomber Field), and I believe these folks have another event scheduled in October, too. So dust off the jet models, get some flights, and I hope to see you at a District VIII event soon!

Happy Landings!

Ron



Team Global Jet Club Hawker *Hunter* taking off.



Bob Price brings his 10-plus year old PCM L-1011 in for a landing.



Scott Harris flying by with his PCM L-1011.

## District VIII Report (cont'd)

Ron Schwarzkopf

Ad Clark's *Thunderbirds* F-16, Smoke On!

David Elizondo landing his new Skymaster T-38.

The BVM "*Flamecat*" torch has been passed to new owner (and new JPO member!) Matt Cho.Roger Kirchner's new *Jackknife* with a very Texas scheme.In a "Blast From the Past", Doug Arnold's *Kangaroo* takes off on another flight.James Smith put several great flights on his new *Hawk*.Craig Gottschang's large *Futura* reaches for the runway.

A gorgeous and large T-45 taking off.



Above and below are just a few of the planes on pit row.



Bill Culbertson ready to taxi out his MiG-15UTI with Derrick Martin (new JPO member) in the back seat.



We have lift off! Which met with the approval of the crowd.



A Super Hornet making a perfect approach - Ron says he has never seen a full scale F-18 land that nicely!



Not to be outdone, this edf-powered MIG flew very well.





## District X Report

Arizona  
California  
Guam  
Hawaii  
Nevada  
Utah

It's been busy few months in Arizona for jet rallies. Up first is the Arizona Jet Rally in Phoenix where history was made. According to long time CD Bob Ruff, for the first time in twenty-five years the skies opened and it actually rained on the Arizona Jet Rally. However, the grey skies and rain did not keep the participants from enjoying the event and bench flying. On display was a collection of magazine articles and keepsakes from the last 25 years showing the history of the event, and each pilot received a goody bag complete with candy and a coffee mug.

In between the rain and the flying, Bob and the Arizona Model Aviators expressed their thanks and appreciation to Larry Wolfe of Jet Hanger Hobbies, presenting him with a plaque and his own personal table for being the only vendor to attend every Arizona Jet Rally for the past twenty-five years. All Larry has asked for in return for his generous support was a reserved table. Thanks again for all the support!

Up next was the resurrected Desert Jet Storm. While the ability to park overnight reduced the camping-crowd numbers, which affected the attendance, around 40 pilots showed up to fly and enjoy the warm temperatures. Seven Colorado and Wyoming residents made the trip to escape the sub-zero temperatures they were having at home and burned a lot of kerosene in engines, not space heaters!

Also in Arizona, just recently, was the Tucson Jet Rally. As usual, the Tucson Jet Rally was a low-key affair and while it was on the windy side, it was down the runway so the flying was plentiful. Friday night saw the BBQ hosted by CDs Debbie and Clay Sherrow followed by some night flying. The Tucson Jet Rally is a fundraiser for the AMA scholarship program in the name of Ryan Sherrow, Debbie and Clay's son and jet pilot who left us too early. In another example of how our hobby suppliers help us out, Paul Steinberg of House of Balsa and Zap donated prizes and money for the scholarship. We in the jet community are very lucky to have the support of these vendors so we need to make sure we support them!

Also in District X was the Best in the West. I don't have pictures for this one, but you can find video of it on You Tube at: [www.youtube.com/watch?v=1lxGHPWkqo](http://www.youtube.com/watch?v=1lxGHPWkqo). It is in several parts, each being around eighteen minutes long.

That is all I have for now, if I missed an event please let me know so that I can give it the time it deserves! My contact information is at the end of each issue of *Contraails*

## David Reynolds

or you can send me a message on the District X Facebook page.

Until next time, enjoy the photos and keep the low passes where they belong.

Dave

### Arizona Jet Rally Photos



Mike Warren and Steve Haynes brought their collaborative *Tazor*, which is edf-powered.



Mike Warren also brought his Best Military Award winning *Hawker Hunter*, from Global Jet Club.



Buck Garza poses with his AMT powered *KingCat*.



Larry Wolfe shows off his Special Appreciation plaque.



Desert Jet Storm Photos



District X Report (cont'd)

David Reynolds



Tucson Jet Rally photos





District XI Report

Bob Brusa

Alaska  
Idaho  
Montana  
Oregon  
Washington

It looks like we are finally starting to see some nicer weather here in the Pacific northwest. Some of us have yet to fly this year, so I hope to get out soon and start burning some kero. Actually, we have had a rather mild winter here in the Seattle area - it only snowed once at my house - but we have had double the amount of rain we had last year. Those of you who live in nicer climates are very fortunate to have a longer flying season.

The events scheduled thus far for District XI this year are:

- Princeton, BC: (Canada actually - but close enough!), from May 29 - June 1. It is a four-day event.
- Boise, Idaho: June 20 - 22.
- Jets Over Whidbey: Aug 22 - 24.
- Finally, there will be another jet event in Princeton, BC, Sept 18 - 21. It will be a 4-day event also.

There are other events in our district that can accommodate turbine models, but it is best to check with the CDs of the events to be sure.

I'm sure many of you follow the jet blogs that are on RCUniverse. There are, quite often, many complaints about products and manufacturers, and they seem to be more prevalent than something good about a product or manufacturer. Likewise, I'm sure most of you are familiar with the Jersey Modeler fuel can, as it is very popular and you see many of them at jet events. Dean Kraus, the owner, has always been very helpful and really takes care of his customers.

After seven years, my battery on the fuel can gave up the ghost, so I called Dean for a replacement. The battery case was also cracked and needed replacement, so he requested I send him just the pump, and he would replace everything, (the battery, case, and fuel can), as he has updated his product. It now comes with an electronic speed control, so you can adjust the fuel flow rate (slow it down to prevent static electricity), and either a 9.6 volt 4000 mAh battery, or a 12 volt 4000 mAh battery, and a charger was also included.

He charged me only for the parts and the price was excellent, so I couldn't pass it up! Dean has been a loyal JPO member for 14 years, so I am suggesting the jet community support Jersey Modeler. It is an excellent fuel can that will give you many years of use, and is backed by someone who will take care of you if you need service. Go to [www.jerseymodeler.com](http://www.jerseymodeler.com) and visit his website. He also has a new onboard fuel filler if you are interested.

JPO is looking for additional volunteers who would like to contribute articles to our *Contraails* magazine, or even be a VP of one our districts. If you feel you have some other expertise to offer the jet community, we'd love to hear from you! We have some open districts available. I'm always open to anybody who wants to submit any article that is of interest to the jet community - whether it be turbine or EDF. Pictures are also great if you have any to share. Send me photos of your latest creation to post in *Contraails*, or even photos of your older jets if you would like to see them in the magazine.

Additionally, if someone would be interested in being the VP of our own Dist XI, I would also like to hear from you to talk about it. I help Carol out with the secretary/treasurer job of the JPO, and if someone would like to take over Dist XI, I would spend more time helping Carol.

If there is anyone who has not yet renewed their membership for 2014, I would urge you to do so. Dues are still just \$25, and can be paid via the JPO website ([www.jetpilots.org](http://www.jetpilots.org)) or to Carol by check. You'll find her address inside the back cover. Also, any new members you may be able to recruit will receive a free JPO T- shirt while the supply lasts.

In case some of you don't follow RCUniverse, there have been two news items worthy of mention. First, JetCat USA has relocated to a new location. They are still in CA, and if you didn't already know, is now owned by John Redmond. Secondly, Ali Machinchy, who lives in the UK and is a world renowned jet pilot, is relocating to the US and will work for Horizon Hobby. His position is unknown at this time.

Hope to see many of you at some of the jet events this year.

Bob



**Bill Broderick's EAF-18G Growler flairs for a landing at the Whidbey Island Naval Outlying Landing field - where its full sized brethren is based.**

## Canada District Report

Jeff Daly



First off, I'd like to thank the Canadian jet pilots for signing up or renewing their JPO membership for 2014 - thanks! Your contribution will strengthen JPO's ability to deliver its mission and pursue its objectives for 2014 and for those who have not yet joined or renewed since 2013, JPO is still providing complimentary T-shirts and Log Books to thank you for your support.

It's time to get the jets ready for the flying season! I'm really looking forward to 2014 as there are some really good events being planned in Canada. Many of the pilots have acquired and built a lot of new & cool jets that I also look forward to seeing. I, as well, just placed an order through Jets North for a Skymaster F-4E with a Jet Central *Mammoth*, which I hope to have ready at some point this summer. I hope to see you out there this flying season!

As we head into the 2014 flying season, be sure to inspect your aircraft, verify capacities of your batteries, verify no air leaks in the air systems, check servo arms and attachment screws/bolts, check the fuel lines for hardness/softness/loose fittings, and do thorough ground functionals on all systems. May we have a safe season and long lives to our jets!

Here are some upcoming events in Canada; you can find more info on [www.RCCanada.ca](http://www.RCCanada.ca):

#### East/Central Canada

- June 7-8: Forest Jet Fest, Forest, Ontario
- June 21: Flying Tigers Jet Meet, Cayuga, Ontario
- June 21: FAN-FAIR 2014 EDF Jets, Ottawa, Ontario (I plan to attend).
- July 25-27: Wingham Jets, Wingham, Ontario (I plan to attend).
- August 15-17: Sky Harbour RC Jet Show, Goderich Airport, Ontario (tentative to attend).
- September 19-21: ThunderThrust over Chatham Kent Airport, Chatham, Ontario (I plan to attend).

#### Western Canada

- May 29 - June 1: Princeton Jets Spring Warm-up, Princeton, BC
- August 8-10: Jets over Tofield, Tofield Airport, Alberta

#### Flaps and Slats

I always try to write a tech article for each *Contraails*, so for this edition, I thought I'd give an explanation of high lift devices, specifically flaps and slats. For those in the aviation community, you may have real knowledge, but for those jet pilots wondering about the differences, I hope you'll find this article useful.

Without being too technical, trailing edge flaps and leading edge slats are high lift devices in that, when deployed, increase the wing sections lift. Specifically, it increases the wing sections lift coefficient (CL). Lift is directly a function of the lift coefficient, air density, wing area, and velocity squared. While flaps and slats increase lift, they also increase drag and nose-down pitching moments, and change the angle of attack (AOA) when stall would occur.

Trailing edge flaps, of all types, tend to lower the AOA at which maximum lift occurs, where leading edge devices tend to increase the AOA where maximum lift occurs. These effects are shown below.

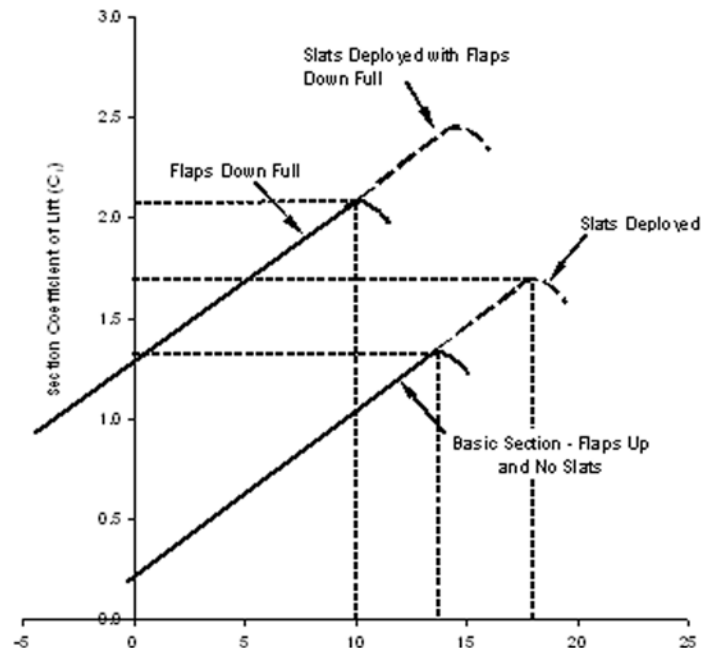


Figure 1: Effects of flaps and slats on the lift curve.

All of these effects can be better explained by looking at the types of flaps and slats.

#### Trailing Edge Flaps

In our jet models, we tend to see plain flaps, split flaps, and slotted flaps (see figure 2). All of these flap types are practical for use during take-off to reduce take-off distance, during landing to reduce landing speeds, and to help slow down the jet on approach due to the drag increase.

Plain flaps are formed by hinging the rear part of wing, just like an aileron. The main effect of flap deflection is an increase in the camber of the airfoil. Airfoils with higher camber have higher lift coefficients and therefore generate more lift. More flap deflection causes increased CL for up to a maximum deflection of 60 to 70 degrees. For a given angle of attack (AOA), the CL can almost double over the flap-up condition, but the maximum CL will be obtained at a lower AOA than with flaps up. This means that the aircraft's wing will stall at a lower AOA with flaps down. The drag is also increased and nose-down pitching moments increase.

Many model jets use plain flaps, such as BVM *Bandits*, F-4s, F-86s and F-100s.

The split flap is formed by deflecting the lower surface of the rear part of the wing. Like plain flaps, the camber of the lower surface is increased, but the upper surface remains the same. Generally, split flaps generate more maximum lift than plain flaps, perform better at higher AOAs, and have an increased stall AOA over plain flaps. However, due to the large wake behind the flap, the drag is much higher than a plain flap. On jet models, the split flap can be found on the T-33.

Slotted flaps provide one or more slots between the main portion of the wing and the deflected flap. The slot(s) direct high pressure air from the lower surface to the upper surface, which delays flow separation over the flap. High lift comes from the increase in camber and better behaved airflow on the upper flap surface. Slotted flaps therefore provide higher lift coefficients and less drag than plain and split flaps; however, there is a greater nose-down pitching moment. On jet models, slotted flaps can be found on the BAE *Hawk*, which are actually double slotted flaps.

**Leading Edge Slats**

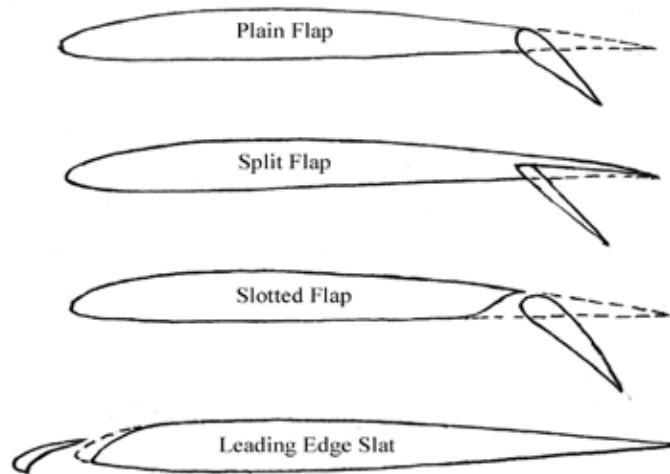
A leading edge slat is an airfoil mounted ahead of the leading edge of the wing (see Figure 2), and are normally retractable on jets. They serve to direct additional air to the top wing surface at the leading edge during high AOAs to delay flow separation (and therefore delay stall). The use of slats may increase the maximum lift coefficient by as much as 0.50. They also increase the AOA where maximum lift occurs - therefore to take advantage of the additional lift, the aircraft must be rotated to a higher AOA than without the slats deployed. Slats have a negligible effect on pitching moments and leading edge slats do create additional drag, but is much less than for flaps. Slats, therefore, are practical for use during take-off to reduce take-off distance, during landing to reduce landing speeds, and for maneuvering at high AOAs. On jet models, slats can be found on the F-86, F-100, F-18, some F-4s, and are retractable.

Reference: Airplane Aerodynamics and Performance, Dr. Jan Roskam, Dr. Chuan-Tau Edward Lan, 1997

**Summary**

I discovered a 1930's N.A.C.A. video of the effects of flaps and slats on airfoils with smoke visualization ... and with hypnotic music. It's not high tech, but still relevant. Have a look at: [www.youtube.com/watch?v=q\\_eMQvDoDWk](http://www.youtube.com/watch?v=q_eMQvDoDWk).

In practice, flaps are essential to allow our jet models to have a decent controlled approach and reasonable landing speeds. Plain and split flaps are effective and much easier for manufacturers to build, while slotted flaps require more precise tolerances to ensure the slot(s) function as designed, and are therefore not too common on model jets because of the complexity in building them. But, if you have the option, slotted flaps would give enhanced performance for take-offs and slow flight maneuverability, as well as an added level of safety at low speeds



**Figure 2: Flap Types and Leading Edge Slats.**

I hope this has been of use to you, and decreased some of the mystery and confusion surrounding these control surfaces.

Jeff



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