Newsletter of the Jet Pilot's Organization

Contrails

Spring 2009

Volume 21, Issue 2

David Shulman shows off an *Ultra Bandit* at Florida Jets.

President's Report — Keith Sievers

Static Electricity

Recently, I have seen quite a bit of traffic on the message boards related to engine shutdowns, with an error message that reads: "Power Fail." The actual text of this message varies a bit between the primary ECU vendors, but the cause is similar. In short, something causes the ECU processor to reset, or reboot, while the engine is in the "running" state. When it regains its self-awareness, the ECU sees the engine is in the "run" condition, and it realizes that there was a problem. The end result is the "Power Fail" message.

As you would probably suspect, ECU processors are pretty durable and not prone to interruption and reboot. That is why many of you may have never even seen a "Power Fail" error message. While there can be any number of reasons for processor failure, one of the more common events is static discharge, as these can reach many thousands of volts.

Static electricity is caused when two materials touch and separate. The amount of static buildup is dependent upon a number of factors, including the materials involved, the speed with which they come in contact and the availability of a discharge path. This last point is why static builds up more quickly in dry air. That is, moisture conducts electricity, making humid air a better dispersion path than dry air is. Applying these principals to model aircraft suggest three primary causes of static buildup…fueling, dry air rushing through the intakes, and wheels running on pavement. The static charge can accumulate in any number of places throughout the airframe and then discharge to the processor through receiver, battery, or engine wiring.

To prevent static buildup in the fuel system, there are anti-static fuel additives and conductive fuel tubing available. BVM sells both. If you find the engine shutting down immediately after takeoff, the problem may be related more to airflow or wheel action and anti-static spray in these areas may help prevent problems. Anti-static spray is available from industrial supply houses like McMaster-Carr. You might test it on an inconspicuous part of the plane just to make sure it is compatible with your paint before spraying it around the intakes. I don't have any experience using my wife's laundry anti-cling spray, but it would probably make my plane smell good even if it doesn't control aeronautical static buildup.

Servo Torque

While we are on the subject of message boards, there have also been a number of threads lately concerning the computation of appropriate servo torque. Thanks to the work of past JPO President Steven Ellzey, there is a very practical formula available for turbine aircraft embedded in the Experimental Regulations. At their April 25th meeting, the EC applied this formula to prop aircraft as well. The formula is available, complete with diagrams, in AMA document 520-A.

The formula's computation consists of three parts. The first, most intuitively, is the area of the control surface. This is simply computed as the average chord times the span. The second is the pressure factor, which varies according to speed, the type of control surface (elevator vs. full flying stab) and the types of maneuver being flown (low G vs. high G). This pressure factor is then applied to the center of pressure, which is typically 1/3 of the average chord. The final element in the formula, one that is missed in some other servo formulas I have reviewed, is the mechanical leverage created between the servo arm and the control surface arm. The smaller the servo arm and the longer the control surface arm, the more mechanical leverage is created, which reduces the servo torque required. This last point is significant, in that limited available torque brought on by tight install spaces in some scale aircraft, can be overcome by increasing the leverage between the arms.

While it sounds a little complicated at first, working one simple example with the Experimental Regulations and accompanying diagrams in front of you will yield a quick understanding. I took a minute to program the formula into an Excel spreadsheet and was able to compute the torque requirements for my ¼ scale *Tucano* in short order.

President's Report (cont'd) — Keith Sievers

One note … the formulas were not really designed for flap computations with internal control surface arms such as the ones you might find on planes like the BVM *Bobcat*. The torque requirements will be scary! However, it does support the recommendation that on these types of control arrangements, the servo arm should point directly at the control surface arm with flaps deployed. In this configuration, the force is not acting rotationally against the servo motor, but pressing directly against the servo output post in a linear, mechanical fashion.

One last thought … be careful not to weaken the airframe structure attempting to install lots of servo torque as this is obviously self-defeating.

Thanks to our Sponsors

As you read this, you hopefully will have received your new JPO logbook for joining or renewing your membership with the JPO. Most of the cost of this book was defrayed by two sponsors … Jet Central and JetCat. Our thanks go out to both these vendors for their active support of the JPO and the turbine segment of our community.

Both vendors have put new products into the market in the mid-range engine segment within the past year. The Jet Central *Rabbit,* rated at 19 pounds of thrust, has seen close to 50 flights in my BVM *Bobcat*. It packs a potent punch in a compact package with acceleration times in the 3 second range. On a typical flight, my measured average fuel consumption averages only 7 ounces per minute. The internal igniter is an excellent performer, and the short preheat wait for it always gives me a minute to run through a mental checklist to make sure I am ready to go.

JetCat has just recently announced their P80-SE, rated at 22 pounds of thrust, and is very aggressively priced at $2195. It also comes with a new ECU, version 6.3, that allows the pilot to shut off the receiver prior to completion of the cool down cycle. The ECU will finish cooling the engine, and then subsequently power itself down. I have not had a chance to operate this engine yet, but if it performs like my *Titan SE*, acceleration times and overall performance will be very good.

Keith

Treasurer's Report

Beginning Balance - 12/31/08		***$9,418.90***
Income		
Membership Dues - Cash/Checks		2,050.00
Membership Dues - Paypal		2,438.63
Log Book Sponsorship		285.00
Bank Interest		23.80
February Expenses		
Fall Contrails	1,138.30	
March Expenses		
Winter Contrails	1,241.06	
Conference Calls	148.62	
Website Hosting	89.55	
Balance - May, 4, 2009		***$11,598.80***
Savings Account		$8,040.76
Checking Account		3,558.07
Paypal Account		0.00
Account Balances as of May 4, 2009		***$11,598.80***

Respectfully Submitted, *Susan M. Moore*

Vice Presidents Report — Al Watson

The weather here in the Pacific Northwest has been miserable this winter and spring. Lots of wind, rain and, on occasion, snow. Normally, we can begin jet flying in late February, but this year my first turbine flights didn't take place until April 7th! Anyhow, the weather is improving fast, so we are looking forward to lots of turbine flying in the coming months.

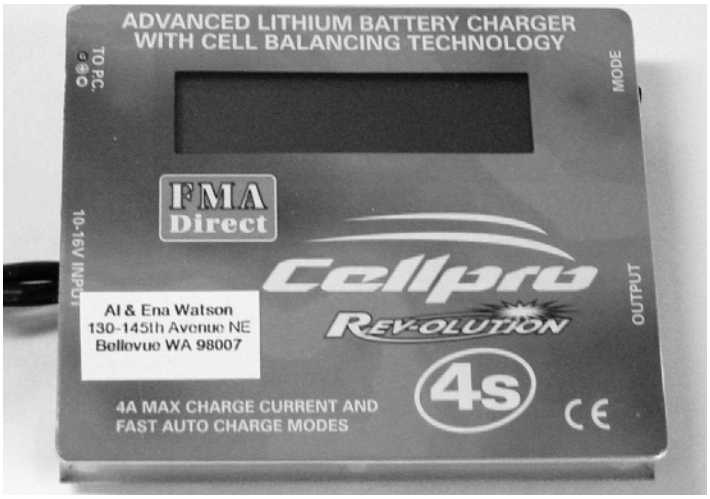
The winter months are a good time to think about and plan new projects, and it is also a good time to thoroughly check existing airplanes so that they will be ready to go when the flying season begins. This winter, I made the decision to switch all my turbine models to A123 batteries - last winter I made the switch to 2.4 GHz.

A123 BATTERIES

Last fall, as I began to research A123 batteries (Lithium NanoPhosphate ... whatever that is!) the following information quickly became available:

- A123 batteries are manufactured by A123 Systems, which is located in Watertown, MA. Originally designed for power tools they are quickly finding their way into hybrid vehicles, including buses and the new Chevy *Volt*.
- A123 Systems manufacture two cells which are applicable to the R/C hobby - Part Number 18650: 1100 mAh, and Part Number 26650: 2300 mAh. They also make a "32 series" cell which is specifically designed for the automobile industry.
- They are 3.3 V/cell so two cells make up a receiver pack.
- They have very low internal impedance, therefore, high current draw does not result in a big voltage drop.
- Very low self discharge.
- A123 Systems claim over 1,000 cycles at 10c discharge.
- NanoPhosphate technology is resistant to explosion and/or fire, even from overcharging.
- Capable of up to 30c discharge.
- Half the weight of comparable 5-cell NiCads.

Wow! This is all great stuff, but now the real work begins. How do I charge and discharge these batteries and who makes packs for our use? Also, I wanted a charger that was designed for A123s and, most importantly, was easy to use. After looking at several chargers and posting some questions on the Battery Forum in RCU I decided that the $50.00 FMA Cellpro 4S charger would take care of my needs. I especially liked the fact that the factory default setting for that charger is A123, which makes the Cellpro 4S basically a plug and play.



Next issue, was what to do about discharging A123s, as the Cellpro 4S is only a charger - no discharge capability. I was surprised that a number of people asked: "What do you want to discharge these batteries for?" Their position was "just figure out what your consumption is per flight; figure out how many flights you can go on fifty percent of the batteries capacity, and then recharge." I've been around this hobby for a long time, and when it comes to batteries, I want some proof that when the manufacturer tells me that his battery capacity is 2300 mAh, it really is. However, what's really important, is that a year or two down the road you want to know if the battery capacity has degraded, and if so, by how much. Discharging is the only way to determine battery health.

In addition, since A123 batteries have a discharge curve that is unique, I was interested in a discharger that would display voltage, in addition to mAh, pulled out of the battery. With these requirements in mind, I called Peak Electronics in Arizona. I have one of their Super Test dischargers for four, five, and eight-cell NiCad/NiMH packs, so I was surprised, and happy, to discover that they had a new version of their discharger

Vice Presidents Report (cont'd) — Al Watson

- the Super Test Pro. This discharger requires a separate 12 volt power supply and can be programmed to cut off between 1.0 and 14.0 volts in 0.1 volt steps, at discharge rates of 125, 250, 500, 750, 1,000, 1,500 or 2,000, mAh. So $100 later, I had my new Super Test Pro discharger.

Now, if I only had some A123's I could have some fun! I found three companies that make up A123 packs - No BS Batteries, Fromeco and Electro Dynamics. I chose Fromeco and procured six-2300 mAh packs for my three turbine-powered models. These batteries come with 16-awg power wires and the connector of your choice. They will also add the charge/balancing tap to match your particular charger. Cost of the Fromeco A123 - 2300 mAh packs is $46.00.

Before I started playing with my new batteries, charger and discharger, I needed to get a little more information; ie: what is a good discharge rate and cut off voltage? So off to the web I went. No BS batteries has a lot of good information about A123s on their Website: www.hangtimes.com, and look for the A123 batteries FAQ. That site suggests discharging at 1 amp and a cut-off voltage of 2V per cell ... so, that is where I started.

When the Cellpro 4S is powered, up the screen will tell you that it is in the A123 mode, and it will also display the percentage (%) of charge presently in the pack; more about this later. Pressing and releasing the mode button will bring up a second screen, which shows the voltages of the individual cells. Pressing and releasing the mode button again will bring up a third screen which shows the current charge rate and the number of mAh added to the battery. Pressing and releasing the mode button again will return you to the first screen. Caution - do not push and hold the mode button during charging! This will change the charger's mode to one of the other chemistries, which will ruin the A123s....

A few comments about the Cellpro 4S:
- It is very easy to use.
- The charging rate starts low and quickly ramps up to 4.0 amps.
- Charger beeps at 100% charge and then switches to the balance mode.
- Beeps when balancing is complete.

The Super Test Pro discharger is also very easy to use. By now you must have guessed that I like stuff like this to be easy! Plug in the A123 battery pack, hook it up to the 12V power supply, set the cut-off voltage at 4V by pressing the higher or lower button; then press both buttons simultaneously to lock in the 4V setting. Use the same procedure to select the discharge rates and the discharge process will begin.

The screen displays the following throughout the discharge cycle:
- Cut off voltage and discharge rate, the same numbers that we just programmed.
- Battery voltage.
- mAh taken from the battery.

I had prepared some graph paper to plot the discharge process, Volts vs mAh, with the Volts from 4.0 - 7.0 and mAh from 0 - 2400, in 300 mAh steps. I wanted to record the voltage at each 300 mAh step, so this meant keeping a close eye on the screen.

The first discharge at 1A did surprise me! The battery came off the charger at a little over 7V and very quickly dropped to 6.4V where it stayed until 1500 mAh had been consumed. By 1800 mAh it had dropped to 6.3V, and from there on the curve was getting very steep

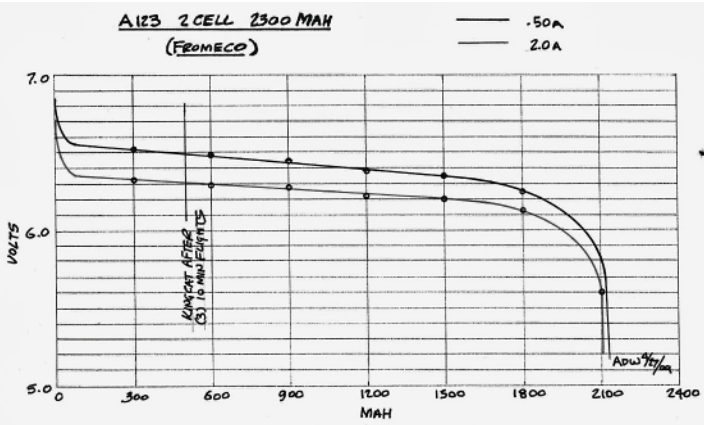
Vice presidents Report (cont'd) Al Watson

...1950 mAh = 6.1V and at 2100 mAh - it was heading straight down. Based on this test I could see no reason to set the cut off voltage at 4V, so all future tests were set at 5V. In addition, I was concerned since the Super Test Pro displayed the pack voltage to only the nearest .1V; so, all subsequent tests were performed with a multimeter tied into the circuit, which allowed me to read the voltage to the second decimal place. Further tests were conducted at .5A, 1.0A, 1.5A, and 2.0A.

I spent a lot of time watching that discharger and multimeter, and I was more than impressed with these batteries ... the consistency from one pack to another was amazing! So, here are my conclusions about all these discharge cycles:

- All packs came off the charger at a little over 7V and the surface charge was gone very quickly. From that point out to approximately 15000 mAh, the discharge was a straight line, dropping only about .1V.

-The tail-off was similar for all packs. The curve was gentle out to 1800 mAh and at 2100 mAh the packs were fully expended - I don't know where the 2300 mAh came from!



There has been a lot of discussion on RCU about selecting a "No Fly Voltage" for these batteries. Look at the attached graph displaying the voltage for a .5 A and a 2.0 A load. If you were to use an Expanded Scale Voltmeter (ESV) to determine a "No Fly Voltage" it would be vitally important that you know the load imposed, and that you selected the "No Fly Voltage" based on a discharge curve that was generated using that same load. This can be a risky undertaking, and I don't plan on going this route.

Let's go back and look at the Cellpro 4S charger. Remember, the charger displays the % of charge in the battery at the start of charging, and throughout the process. I did a number of tests with batteries that were partially charged to validate the percentage of capacity shown, and found that it was reasonably accurate. So, to determine the state of charge you can simply plug your pack into the Cellpro 4S, look at the fuel percentage, and go from there.

Now it was time to get some flight time on the A123's. For this part of my evaluation I used my *Kingcat* with two 2300 mAh A123 packs installed. My flight timer is set for 10-minutes and the timer is started after I am in take-off position on the runway. The plan was to charge both packs after three flights and record the number of mAh to get back to 100% charge. Looking at the data from the first set of three flights, I consumed 507 mAh and 535 mAh. The second set of three flights, 475 mAh and 505 mAh. Averaging these numbers, the *Kingcat* consumes a little over 500 mAh from each of the two batteries for three flights. Based on that data, I could easily fly six or seven flights and still have a good margin of safety. So, for my A123 battery packs, I have two ways to determine if it is okay to fly - plug them into the Cellpro 4S and look at the percent-charge in the battery, or since I know that three flights consume approximately 500 mAh from each battery, I can easily determine when to recharge.

A few final comments: There seems to be a question as to whether or not balancing is required on these two-cell packs. Since the Cellpro 4S has the capability, why not use it? If you look at the second screen during charging, you will see the individual cell voltages, and the biggest difference I have seen is less than .05V. I have been letting the charger balance the packs every third or fourth charge when it is convenient. Another question concerns state of charge during storage. I have seen 100% mentioned and also 50%. All the packs I got from Fromeco seemed to be around 50%, and all seem to agree that you should not store these packs fully discharged, additionally they are best kept at room temperature.

Anyhow, I hope that you have found some of this information useful. I believe that A123s will be the battery of choice in the future for our turbine-powered models.

Happy Flying!
Al

District I Report

Bob Radford

Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Here it is, May already, and we are about to kick the 2009 Jet season into high gear.

Some of us are headed down to the Mount Pocono Jet Together from May 15-17. As that is still a couple weeks in the future as I write this, I'll have to tell you about how that went next time. We have a couple of other nearby jet rallies coming up: Big Apple in June, Capitol Jets in July, The 4th Annual New England Jet Rally in August and the Maine Jet Rally in September. Those are just the ones close by (within 5 hours of southern NH). If you want to travel; you could spend the 4th of July, and the following week, flying jets in Kentcky; and then drive to Capitol Jets in Albany, NY, for another 3 days of flying. I'll bet that itinerary has crossed Jim Brown's mind! Jim is our good friend to the north, who always gets to be on vacation whenever there is a jet meet. He's a great flyer and a lot of fun.

This promises to be an exciting year. I've been in contact with two new prospective jet pilots, one of whom has an F-16 waiting to go. Hopefully, we will do the maiden flight on the F-16 by the end of May. Some other folks have asked me where I fly my jets - unfortunately, it's only at the jet meets or after a four hour ride to Plattsburgh, NY. Needless to say, I don't fly them enough! I have been building an F-16XL for a couple of years, and I think this will be the year to finish it ... first as a ducted fan, and then as a turbine-powered jet.

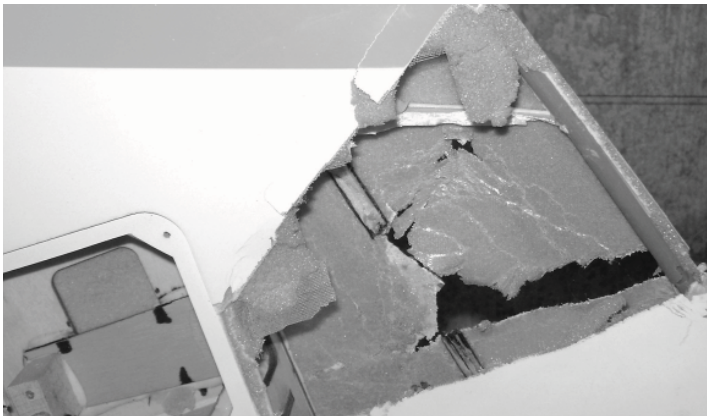
A couple of good friends of mine now have an *Ultra-Bandit* in their hangar, so that will be a treat to see and maybe, just maybe, get a little stick time on. A number of folks have, or are thinking of getting, *Shockjets* or similar aircraft so they can fly jets at their local flying fields. The more exposure jets get in the mainstream of R/C, the better for us.

Last issue, I began a series on aircraft repair. I had planned to continue the series this issue with composite wing repair. However, cold weather kept me out of the basement, and studying for my Project Management Professional certification kept me away from the models. Having passed the exam, and the arrival of warmer weather, I expect to continue with the next issue, so I've enclosed a couple photos of the wings I plan on repairing. Look at the wing photos and see if you can figure a way to repair it, and we'll see if I chose the same method.

The officers and district representatives of JPO have come up with some exciting ideas for this year and in the near future, pilot logbooks will be issued to members, and will eventually be available for sale at jet meets. Also, JPO shirts may become available for purchase. We have a membership drive underway to boost our ranks, so if you haven't renewed, or wish to join, please do it as soon as possible on the JPO website, and to make things easy, you can use PayPal.

Please feel free to contact me to discuss ideas you may have or assistance you might need in this exciting world of jets. Contributions of pictures, ideas or material for *Contrails* would also be appreciated.

See you around the circuit
Bob



District II Report

Art Arro

New Jersey
New York
Europe

Greetings District Deuces, it appears that spring has finally sprung here in the northeast. This means flying our jets at sanctioned events or at local sites. I usually start with a high performance prop-jet before flying my turbine-powered sport jets and graduating up to scale jets. This builds confidence, and ensures safe flying with the turbine-powered models.

I'd like to thank all who voted for me in the last election. I hope to represent all jet fliers, not only within District II, but within North America. My first business item is to appoint Len McIntosh as the JPO District II Assistant Vice President (AVP). Len has been a long-time, active JPO member, and being recently retired, he has agreed to help better represent District II's jet interests. He resides on Long Island, NY and flies at Floyd Bennett Field along with other sites in the metro NYC area. Len's e-mail is: lmcintosh@verizon.net. Send him a message along with any pertinent comments about R/C jets.

Len, myself and several other District II jet jocks traveled south in early March to attend Florida Jets 2009. It was one of the best jet events ever, with 146 pilots from numerous countries flying R/C jets in near-perfect weather for 4 consecutive days. I served as a pit monkey for Jorge Escalona who flew his brand new Skymaster F-4 *Phantom,* powered by a Jet Central *Rhino* turbine. Needless to say, the flights were flawless and Jorge won a special recognition award at the Florida Jets' banquet. Our own JPO District V Rep, Craig Gottschang, collected multiple awards with his Mibo A-10 *Thunderbolt II/Warthog*. Craig even incorporated an audio clip of the big Gatling gun during simulated strafing passes. There were hundreds of sorties logged during Florida Jets 2009, with only a few mishaps noted. Frank Tiano, our former JPO Prez, really outdid himself with the organization and management of this huge R/C jet event.

One item acted upon over the winter months was the formation of an Electric Ducted Fan (EDF) Committee composed of Dave Reynolds, Kirk Sonnier and myself. The goal of this committee is to meld our knowledge of EDF for the membership and to our Knowledge Bank. This committee would like your inputs on what is to be researched and stored in the Knowledge Bank. Dave has expertise with general EDF, and the technology associated with this propulsive power. I have experience with the smaller EDF, at about 60 mm diameter, as flown in Alfa Models MiG-15 and A-4 Skyhawk. Kirk's experience is with the larger EDFs-100mm and up, and has contributed several articles to the RCJI "Whistling Watts" column.

To begin flying EDFs, we must ask ourselves what's in it for me? My own answer is an alternative to turbine-power for jet-powered flight. I can fly my EDFs at many local fields where turbine-power is not feasible. Also, there is a relative reduction in support equipment required for EDF flight. Finally, EDF offers reliable jet power and no turbine waiver is required. The hobby phase of EDF is expanding rapidly and there were more EDF exhibitors at the Toledo R/C Expo than turbine vendors.

EDF models and vendors were also present at Florida Jets 2009. In addition, there are several EDF-only jet events being sanctioned for 2009. Again, the JPO-EDF committee would like to have your feedback in pursuing this form of jet-powered flight. Kindly contact any or all of the committee with your views and opinions on EDFs.

Red Flag is a term that all of us should be aware of. For those with military flight experience, Red Flag is a major exercise involving counter-air tactics and command-and-control functions in a simulated battle environment. For us, Red Flag is a condition posted by the National Weather Service when conditions are critical for wild fires.

These conditions include hot temperatures, low humidity, moderate winds and a relatively dry fuel source such as brush and trees. Red Flag warnings are usually issued for county-wide areas with specific dates and times. Local burn bans may be included in these Red Flag advisories or warnings. What all this means to us turbine jet pilots is that we should be aware of these conditions and conduct ourselves accordingly. Water-based fire extinguishers are mandatory and we should know how to contact local fire fighting authorities. Contest Directors, hosting jet

District II Report (cont'd) — Art Arro

events, should be aware of possible wild fires during Red Flag conditions posted in their county. Fire fighting equipment can be pre-staged at probable crash zones and contact numbers for fire fighting authorities can be entered in cell phones for rapid response.

The best method of fire prevention is to shut the turbine down if there is any possibility of a crash and subsequent fire, and your spotter should know how to shut down the turbine, if required. Be sure to provide instruction and authority to accomplish this important safety practice.

The National Weather Service may be contacted at: www.noaa.gov. Go to this website and open the link to NOAA's National Weather Service. You can see the entire US, and click on your specific region for the latest weather and warnings, including Red Flags.

To date, there are two jet events scheduled within District II. The first is the 17th Annual Big Apple Jet Rally from June 27-28, 2009 at Floyd Bennett Field in Brooklyn, NY. Consult the "Model Aviation" Contest Calendar for a listing of this event, and additional information may be posted on the Jet Events (US) segment of RC Universe. Len McIntosh should also have information on this long-standing District II jet event.

The second jet event is Capitol Jets V to be held July 10-12, 2009 at the S. Albany Airport in Selkirk, NY. Frank Alvarez and I will co-CD this event and we are both working to make this the best one ever. Further information can be gleaned off our website: www.capitoljets.com. Capitol Jets V will be JPO-sponsored and include numerous awards, including: Best Sport Jet, Best Scale Jet and Peoples' Choice.

Plan now to attend (and fly) at either or both of these District II events.

As always, I look forward to hearing and seeing all jet pilots within the District and beyond. My contact information is listed elsewhere in this newsletter and on our website: www.jetpilots.org.

Art

District VI Report (Cont'd)

My current project is a scratch built SR-71, at 1/8th scale. It's in the home stretch and has already had a few success full-turbine test flights.

If you're curious, I've kept a web page going for years at: www.mmrca.org/lance

Lastly is a heads-up to the members of District VI. We have a tremendous wealth of knowledge in our district, and one of the busiest jet meet schedules, too. I'm going to look to you for content. I don't care if it's two sentences about a cool sanding-tool idea, or a one page dissertation on how to get a battery to jump up and tap dance.

Additionally, I'd like photos, and captions when possible, to showcase people and planes as well as the events.

Thank you for the opportunity to be your District Rep, and I look forward to helping out in any way that I can.

Lance

District III Report

Mark McCracken

Ohio
Pennsylvania
West Virginia

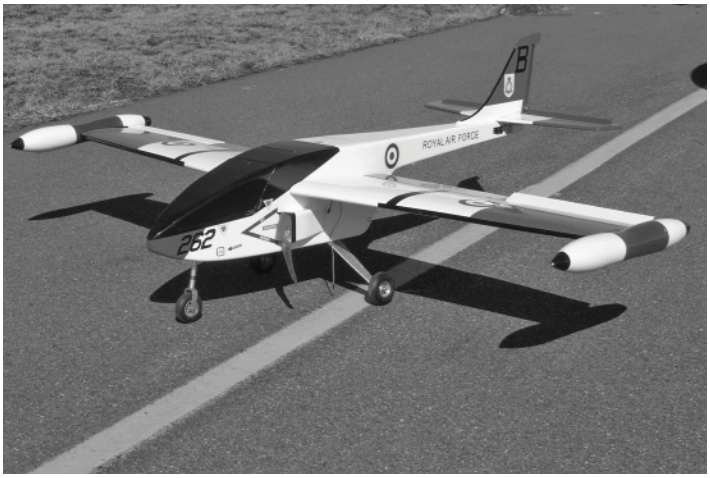
Well, I think we can say Spring has begun after a long hard winter season. Although District III has been very quiet, I had a chance to issue a waiver to a new jet pilot in our district.

George Gale of Wilkes Barre Pa, has been flying for many years. After watching Larry and me fly our turbines, George has decided it was time to join us and purchased a Baby Boomerang. When George decided to get into turbines and found the right buy, the winter season was coming up fast, so with many hours of help from Larry and myself, George has demostrated he can fly with the best.

There are a few jet events coming up in District III and I will post a few pics and a story line as they happen. By the time this issue of *Contrails* gets in your hands, a new jet event will have passed. This will be my first no thrills event here in the Poconos. My intent for this event is to just bring your gear and fly. No big tents and no prizes to give out. I will give you all the details in the next issue. The next event will be the Liberty Bell Jet Rally July 30 - August 2, 2009.

As I was cleaning out my computer, I came across a few pics from other events that were never posted.... Watch for the next issue.

District III Report (cont'd) Mark McCracken



District V Report

Craig Gottschang

Alabama
Florida
Georgia
Mississippi
Puerto Rico
South Carolina
Tennessee

The jet flying season is in full swing in District V! As reported in this issue of *Contrails*, Florida Jets was a great kickoff event and another large gathering of jet pilots is expected at the Mississippi Afterburner. We just missed the *Contrails* deadline for May, so look for a complete event report in the next issue. I also had the opportunity to visit the Desert Storm Jet Fly-in held in early February near Phoenix, AZ. It was great to meet many of the pilots I "know" through online discussion groups, by reputation and through the JPO, including *Contrails* editor, Greg Moore. Greg and all the other guys made me feel right at home and Jim Hamm even let me fly his jet! Although most of the names and jets are different at various events around the country, there is a familiar atmosphere and camaraderie at every jet event I have attended. What a great hobby!

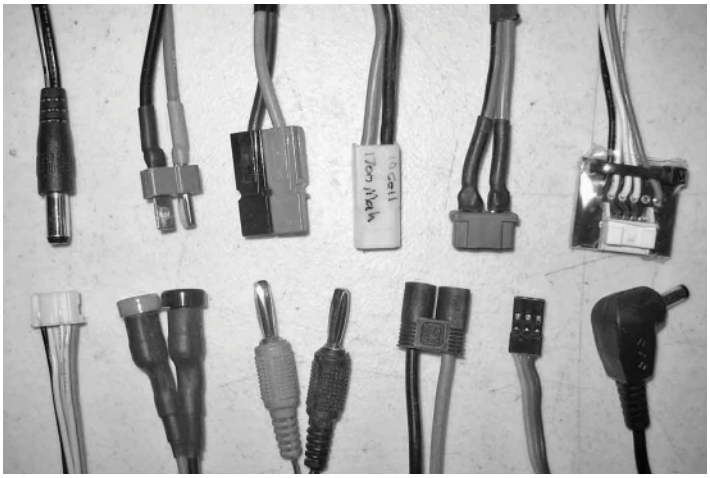
We're Number One!

The Georgia Jets Flying Club, located just south of Atlanta is one of the most active and recognizable jets groups in the country. GA Jets members attend many of the jet events in the southeast and mideastern part of the US, and have been well represented in the winners' circle at Top Gun and elsewhere. The club flying site is one of the finest in the country and hosts the annual Super Jet South Jet Rally in September.

Georgia Jets now has the distinction as having the most members of any club belonging to the JPO! Following the recent membership drive in District V, the Georgia club now has at least 15 members who belong to the JPO! Both seasoned members and relative newcomers to jets in the club recognize that the JPO is our best opportunity to control our own destiny and to preserve and improve the great sport of R/C jets. Georgia Jets' members encourage you to actively promote the JPO in your own club

Art Arro wrote an excellent article on batteries in the last issue of *Contrails*. His indepth explanation of the characteristics of current battery types and methods for use, charging and storing was informative as well as a useful and practical guide. When I consider all the different battery types available, it can become overwhelming to keep all this information straight in my mind. It seems that every new battery technology has its own set of characteristics, applications, advantages, disadvantages and unfortunately, its own special type of charger. Sometimes I wish we could go back to the days when NiCads were the only choice and a Litton Alpha 4 charger (if you could get one) was all you needed.

An option, I suppose, would be to change all your batteries to whatever the latest and greatest technology happens to be, but that's not economically practical, nor does it consider that "older" technologies are still very well suited to a variety of jet applications. Also consider that we are not just talking about batteries for receivers, transmitters and ECUs, but also for smoke pumps, onboard lights and an assortment of support equipment such as air compressors, fueling pumps, blowers, field batteries and cordless tools.



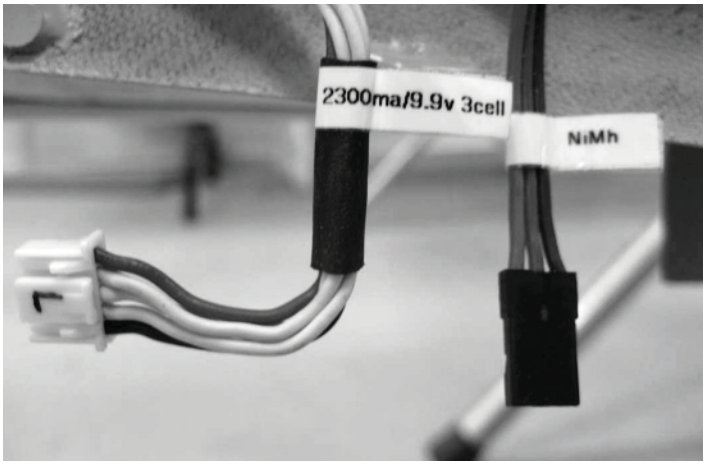
Some of the many battery connectors currently used in R/C jets. Adaptors can minimize the number of charger connecting leads needed.

Therefore, we are left to manage and charge numerous battery technologies with numerous types of chargers and connectors. I have over 20 batteries to charge when I take 3 jets to an event and I use as many as 10 different chargers! Many of these chargers were "state of the art" at one time yet all seem to use different and sometimes cryptic methods to program

District V Report (cont'd) Craig Gottschang

their various and often complex functions. Worse, most will only charge 2 batteries at a time and it may take multiple chargers to service a single jet. What we end up with is a confusing collection of chargers, connectors and charging/programming procedures. In an effort to bring some order to this battery chaos and complexity, I have developed some techniques and organization of my equipment that, at least for me, helps.

First, I make sure that every battery in my jets is clearly identified. I start with marking the purchase date directly on each new battery as soon as I receive it. This way I can keep track of a battery's age and replace it as appropriate. It's also important to remember the capacity, number of cells and chemistry type of each battery, but easy to forget since they are frequently buried in inaccessible places, such as the nose. I either print the information adjacent to mounted charging receptacles or on a piece of tape near the end (or on) loose charging plugs. A small strip of masking tape, or even better, ¼" label maker tape does the job.



Charge lead labels indicate number of cells, voltage and mah on one side, chemistry on the other. Helps ensure proper charger and charge settings.

To organize my chargers and their associated connectors, I store each one in its own plastic shoebox-sized container and clearly mark which charger it is on the side and top. If it has its own wall power supply, I put it in the box as well. I'm always careful to put the appropriate instruction manual inside the box so it's available when I need it! I keep the chargers together on shelves in my shop and before an event just load them up in my trailer.

To keep organized, each battery charger, its leads and instructions has its own box.

Accu Cycle charger in its box along with a/c power supply, associated connectors and instructions.

A final suggestion is to consolidate connectors to a minimum number of common types, such as JR, Multiplex or Deans plugs. Unfortunately, ECUs, power expanders and even receivers, often come with a variety of different connectors and are not practical to replace. Balance plugs can be even more diverse, with their multiple wires and configurations. In these cases, adaptors from one type to the other can at least minimize the number of charging leads you will need.

There's no perfect solution that I know of to manage batteries and probably won't be as long as battery technology continues to advance and improve. Nevertheless, batteries are the heart of our jets and we need to be absolutely meticulous in their care, charging and use. Being organized and methodical is a good way to start.

District V Report (cont'd) Craig Gottschang

Florida Jets

Despite concerns about the economy, and poor weather in recent years, Florida Jets 2009 continued its tradition as the unofficial "kick off" event for jets in the eastern half of the United States, and attracted a large numbers of pilots and vendors. The 168 registered pilots and 37 vendors attending were rewarded with nearly perfect weather conditions throughout the four-day, early March event. Eight pilot stations meant that numerous jets were in the air at all times, and an estimated 640 sorties were flown. With the exception of one mid-air and several flameouts, there were a minimal number of jets damaged. It was largely agreed that this was one of the best Florida Jets ever!

It would not be practical to attempt a comprehensive report of all the jets and activities at Florida Jets in this article. Instead, I will offer a few general observations and highlight some of the jets and pilots that caught my attention (and my camera lens).

One inescapable observation is that Florida Jets is THE jet event in the east, and probably the entire United States. This is the only event that attracts most of the major kit, turbine and radio manufacturers in one location, giving the jet modeler the opportunity to browse, compare, ask questions and maybe even take advantage of "show specials." Furthermore, most of the top manufacturers demonstrate their products during the event and many are featured during the "noon-time" flying demonstrations. Top pilots, such as David Shulman, Dustin Bucher, Lewis Patton and Ali Machinchy put their jets through impressive routines as Sam Wright, the smooth-talking announcer, describes the maneuvers, special features and particulars of each jet. The unique appeal of Florida Jets can also be confirmed by the large number of jet pilots who attend, not as registered participants, but simply as jet modelers who want to see the latest products and watch the flying action.

Florida Jets is also a bona fide international event. Participants came from Canada, England, Germany, Spain, Mexico, The Netherlands, South America and other countries. Notables included Thomas Singer and Stephan Volker from Germany, Raul Lozano from Spain and Ali Machinchy from the UK. U.S. participants came from as far away as California.

A continuing trend in our hobby was also very evident at Florida Jets, namely the ARF jet. I don't know the overall numbers but only 5 of the 19 award winners had full-kit-built jets (i.e. not ARFs). I suspect the ratio of open flying jets was even more heavily-weighted in favor of the ARFs. It's not hard to see why; the current generation of ARFs are becoming more difficult to distinguish from their kit-built counterparts in both appearance and flying qualities. Manufacturers' displays also reflected this trend, and virtually all the new offerings were ARFs of some type.

Your JPO was well represented at Florida Jets! We managed to secure a tent near show center, and proudly displayed the JPO banner, as well as a sign inviting new members to join. President Keith Sievers was in attendance, along with Dist II rep Art Arro and myself, representing hosting District V. Several new members were recruited during the event as well as a number of renewals.

Florida Jets is both an event and a spectacle! The manufacturer-sponsored Friday night tent party and the Saturday night banquet are becoming legendary, and can only be fully appreciated in person. Frank Tiano is the mastermind behind it all, and each year demonstrates why he is probably the best "promoter" in R/C. Nevertheless, Frank is quick to give credit to others, particularly the Imperial R/C Club members who work the parking, radio impound, crowd control and, most importantly, the flight line. Once again, they managed to keep flights running smoothly and safely throughout the event.

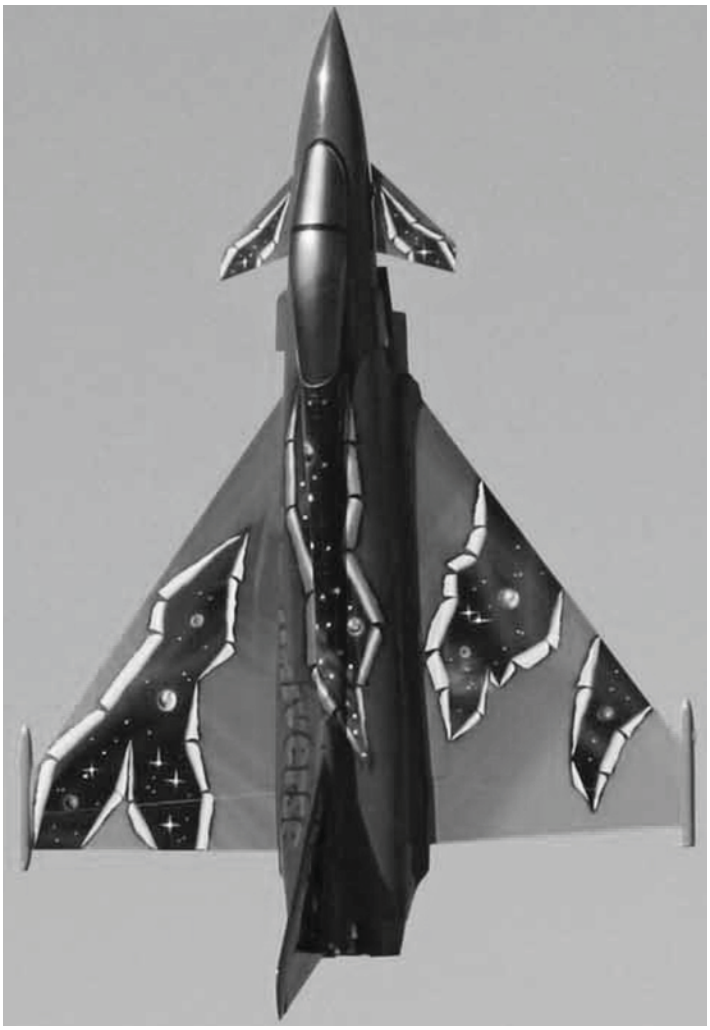
District V Report (cont'd) Craig Gottschang

The following pictures are representative of the aircraft, pilots and flying that took place during the event. For a complete list of vendors, award winners and many more pictures, visit www.franktiano.com and click on Florida Jets 2009.

Perfect weather and 8 flight stations meant lots of flying and entertained spectators. Walt Larson's MIBO A-10 in foreground won Critics Choice runner-up award.

Joe Rafalowski's superb custom-painted *Ultra Bandit* on a show pass.

JPO member David Shulman's *Ultra Bandit* on a low and slow pass. David won the Most Outstanding Jet Flight award.



Thomas Singer hovers his thrust-vectored *Eurosport*. Thomas earned the Best Sport Jet Performance award.

Johnny Hernandez's Air World Mig-21 on a gear check pass. Johnny's P-160 powered BAE *Hawk* won the Best Military Jet award.

District V Report (cont'd) Craig Gottschang

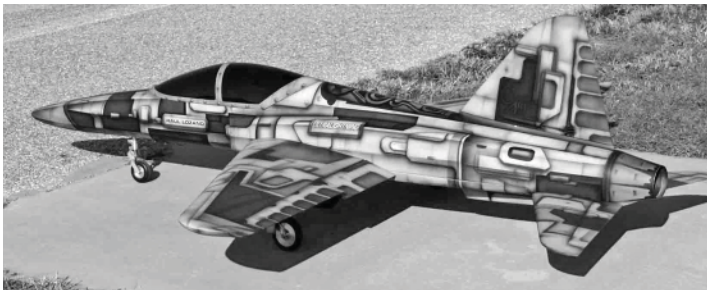
German Marc Froehm lands the big Comp ARF A-4 sans wheels. Minimal damage and the missing wheel retaining clips were installed for subsequent flights.

Ali Machinchy's P-160 powered Skymaster *Viper Jet* on a slow knife edge pass. Ali won a Special Recognition award for his flying skills.

Ken McSpadden's Skymaster MB-339 on landing approach. Jet was later lost in a mid-air; one of the few serious mishaps of the event.

Big Skygate BAE *Hawk* owned by Phillip Weikart and flown by David Shulman on landing approach. This jet also won a Special Recognition award.

Lewis Patton's Fei Bao F-15E about to touch down. Powered by Jet Central *Rhino*.



Spanish national R/C champion Raul Lazano's *Rhino* powered *Ultra Lightning*. Star Wars inspired paint scheme and smooth flying earned him a Special Recognition award.

P-160 powered Phillip Avonds F-16 flown by Mexico's Louis Ceja. Superb flying and impressive smoke system won him the Best Scale Jet Performance.

District VI Report

Lance Campbell

Illinois
Indiana
Kentucky
Missouri

Lance.... Lance who?

That may be what you're asking yourself right about now. I'll be the one taking up the mantle of your new District VI JPO rep. I look forward to trying to fill the shoes of those before me, and am intrigued by the new direction JPO looks to be going. I think the concept of more of a resource to the jet pilot, instead of an enforcement arm of AMA is a welcome one.

Mostly, this column will highlight your projects, tips and tricks, along with reports of jet activities in our area. However, this first time out, I'll answer some of the "Lance who?" questions, so you know a bit about my background.

In our age of safety conscious turbine usage, I kind of cringe at what I'm about to own up to... I started R/C flying with my grandfather over 30 years ago when I was a young teenager. One day, while sitting on the back deck of my father's place in the country, my grandfather proposed that he and I build an R/C airplane so we could buzz the neighbor kid on his riding lawnmower. Maybe it was his attempt to peak the interest of a young boy about to be distracted by cars and girls, but it worked. Little did we know, but Mike (the neighbor kid) was safer than he ever knew, as we tried to teach ourselves how to fly, on 2 SIG *Kadets* with an old Kraft radio. I think those two planes were crashed and cart-wheeled a dozen times each, and we never even got them into the air for more than a couple of minutes.

The next year, we were about to give up when we took a step backwards, and went the way of .049 powered gliders. We learned the basics, and, at times we were flying the two gliders together, having a great time. Now, rooted in some basics of R/C, we returned to powered planes, and progressed through the SIG line; ending up with a *Kougar* and having a lot of fun with aerobatics.

This was about when the jet bug bit us, and we started with a Byron F-20 *Tigershark.* After a year with this bird, we went to the big show of the time: The Byron show in Ida Grove, IA. Here we saw a new company demonstrating some impressive wares, and flying circles around the Byron stuff. The just released BVM *Aggressor II* was really cooking around the pattern, and by that winter, one was on the bench.

Both birds did good once in the air, but had trouble lifting off of the grass fields where we flew. To help address that, we went back to a simple design, and tried a non-retract version of a *Regal Eagle*.

All the while, we had to learn how to keep up with good maintenance in order to keep these three machines running, while their engines were wanting to disassemble themselves.

About this time, my grandfather passed away. I took it pretty hard, and didn't really do anything with planes for a few years. After a spell, I thought back and was determined to get all three jets going, and going well. I also remembered a comment by BV, he had said that you need to get out and go to jet meets to really learn anything.

The first jet meet I, and a few of my buddies, went to was one of the early Supermans. I learned more in the 3 days we were there, than 3 years on my own. Even if you don't fly much, go to the jet meets and poke about and ask questions. The jet guys are some of the most helpful out there, and will bend over backwards to help you.

After doing well with the above birds, I felt adventurous and tried a Yellow Aircraft SR-71. After a lot of patience, and 3 fuel systems, I finally got a ducted-fan system / fuel system working on that bird, and it flew well for 3 years.

About now, the turbine bug was starting to bite, so I started out with a Phillip Avonds F-15 with an AMT *Mercury*. This bird has been my workhorse, and has had 8 years and 400+ flights put on it. A few years ago, I upgraded the engine to a JetCat *Titan* and put in a Tam's Smoke System. I continue to have a lot of fun with it.

Concluded on Page 9

District VIII Report

Ron Schwarzkopf

Arkansas
Louisiana
New Mexico
Oklahoma
Texas

Hello JPO'ers in District VIII…

My name is Ron Schwarzkopf, and by process of election (or elimination), it seems I will be your next JPO representative - so, lucky you! Thanks to Sam Snyder for being our rep for the last few years. Something tells me he wants to spend more quality model-building time with his Exacto knife and stacks of balsa, so passing on being our district rep for a while might improve his rate of scratch-building jets to about one per five months…Heck, I've taken that long, or more, in getting some ARF models out of the box!

As a bit of background about myself, my line of work is mostly centered around the design and testing of wind tunnel models - in the past for McDonnell Douglas, and currently for Lockheed Martin in Fort Worth. In the world of R/C, I flew pattern in the midwest for a while, got into ducted-fans back in 1989, and into turbine-powered models in 2002. Now, my prop planes are mostly relegated to testing receivers before they go into a jet.

Finally, we are getting some decent flying weather in our district, which means it is time to check over our models to make sure they are ready for the flying season. Cycling batteries, checking air and fuel lines for leaks, looking over landing gear are all good ideas to minimize having to deal with these issues at the field. Personally, I found a bunch of gunk in a fuel filter attached to my Jet-A can - most likely, a collection of algae and/or dirt.

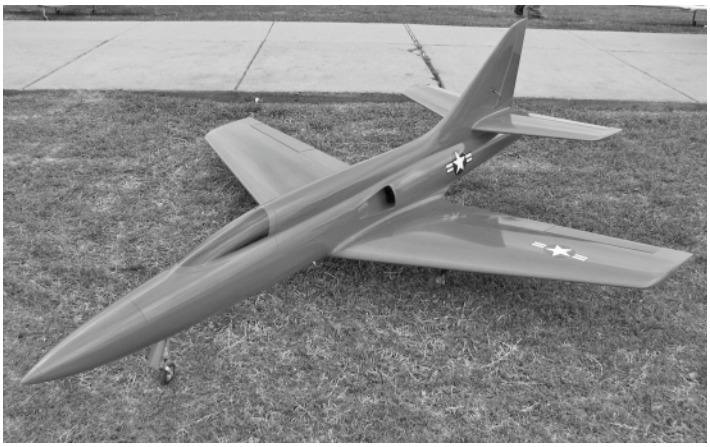
The new flying season also brings new models out to the field ready for first flight. If you have a brand new model you've been waiting to get a flight on, or even if you've done some reprogramming in your radio for a particular model, you might want to make sure you do this one simple step - even before doing the range check. Pass the transmitter to someone else! By having another experienced flier check your control surfaces for correct deflection, you might save your model from an unintended fate. A local modeler recently fell victim to this, and it was really unfortunate to see the brand new model roll over just after rotation. The person was very experienced, but a simple control surface check with another set of eyeballs could have prevented the event from occurring.

I am writing this article just after getting back from Houston. I was able to attend The Bayou City Fliers Jet Fly, CD'd by Ray Blair and held from April 3-5, 2009. This is the club's second jet fly, but the first I've attended. The club flies at Dick Scobee Memorial Field, an R/C park located within a city park maintained by the Army Core of Engineers. With a 635 x 80 ft runway, it is a field very suitable for jet flies. The event was run very well, drawing in 30 attendees and lots of spectators, and it appeared all had a great time. I talked with a couple R/C fliers from the Houston area who are now seriously considering getting into R/C jet models, so it looks like the event helped recruit a couple more turbine modelers. Several club members took part in a Saturday night nite-fly, flying electric *Stryker* models equipped with very bright light systems, and that also looked like a lot of fun. I know that if my schedule permits, I will attend next year. Included in this report are a few photographs from the event. As usual, I should've taken more pictures....

Make sure you check the back of this issue for a listing of upcoming events in this district. Also, if you have any questions, or want something published in *Contrails* regarding our district, let me know.

Happy Flying!

Ron



Bob Rodger's beautiful scratchbuilt "*Bobsicle*" flew as nice as it looks.

Continued on page 22

District X Report

David Reynolds

Greetings from Arizona. I would like to take a moment to introduce myself.

I am from Tucson (the c is silent for you east coasters) Arizona and have been flying model airplanes for a long time, starting out with control line (Real Control) competing in racing and Navy Carrier. My first jet was a Midwest *Jetster* powered by an O.S. .25 VFDF in a Kress RK720 fan-unit. I have since had many *Jetsters,* with my current one being over 20 years old and still flying with a WeMoTec Midi fan.

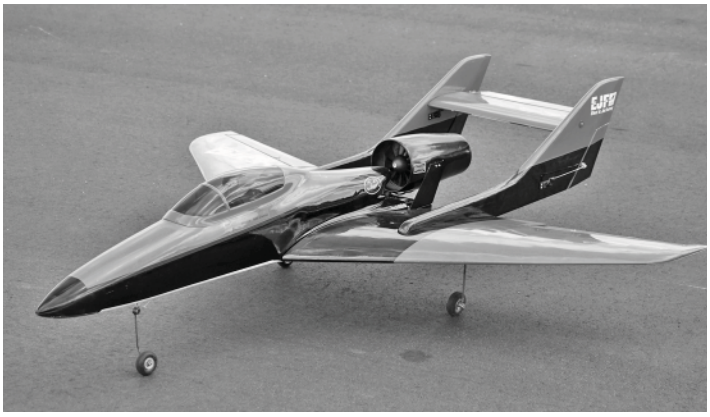
Generally, if it flies, I find it interesting. My hanger has jets, indoor micro flyers, gliders, park flyers and a helicopter or three, though I haven't started a gas engine in many years. I also enjoy experimenting with flying wings and anything strange looking. The current project is a Yellow A-4 that will be powered by EDF. Fighting for space are also some R/C cars and a 1500 cc Kawasaki *Vulcan*. All this fun is interrupted by warping the minds of the future at Sunnyside High School.

Enough about me. If you have a cool jet you want to show off or a great event that we should know about, let me know and send some pictures my way. If you have questions about EDF, please feel free to ask, I may not know the answer myself but I will know who does.

I leave you with a few shots from the Desert Jet Storm Rally held in Phoenix every February. Next time I'll have some shots from the Tucson Jet Rally.

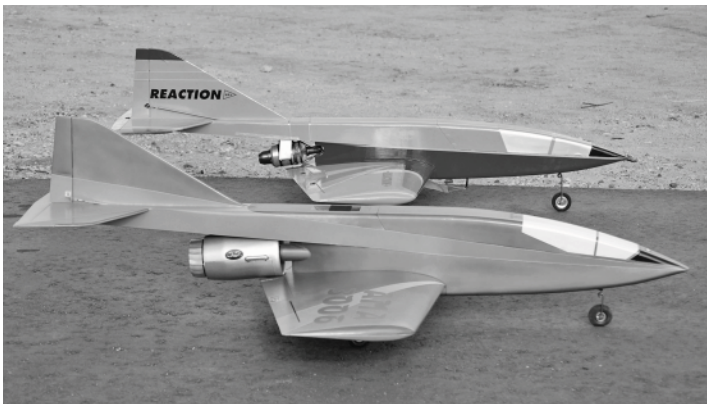
'Till then, keep the low passes where they belong.

Dave



Clay Sherrow's Dyn-e-Max EDF-powered *Falcon-120*.

Brian O'Meara's *Cougar* smokes on past.



Dave Rigotti's Wren MW-44 powered 82% *Reaction* (rear) and Bob Reynold's 82% Hoaye-4.5-inch fan EDF version (front) shared ramp space.

District XI Report — Bob Brusa

Alaska
Idaho
Montana
Oregon
Washington

I attended the Tucson Jet meet in March and had a great time.

There were 28 registered pilots for Tucson Jets, and the most surprising thing for me was the number of electrics that were present; EDFs seem to be on the rise. We had great weather and the facilities were super. This is a very nice event, one you may want to consider for next year. On Saturday night, a big spaghetti feed was put on for anybody interested.

Now that the northwest will be coming out of one of its worst winters on record, it's time to think about upcoming events. From May 28-31, and then again from Sept.17-20, our friends to the north will be holding jet events in Princeton, British Columbia; these are four day events. Idaho Jets takes place from June 12-14 in Parma, ID (near Boise), Montana Jets is July 17-19 in the Kalispell/Whitefish area, and Jets Over Whidbey (JOW) is from Aug. 28-30 on Whidbey Island, Wa.

The Apple Blossom Festival in Wenatchee, WA., will be over by the time you get this. It is a fly-in for all types of aircraft. Two of us have gone for the last two years to showcase jet-turbine models, and I'll have a report in the next issue of *Contrails*.

As always, if there are any pictures or articles you would like to see here, please contact me with the info.

Upcoming Events

3rd Annual Central Plains Jet Rally: June 4-7, 2009
Wellington, KS
www.clearviewfield.com

4th Annual Blue Grass Jet Jam: June 4-7, 2009
SKYMAC Club Field
Bowling Green, KY
www.skymacrc.com

Missouri Valley Jet Scramble: June 5-7, 2009
Tecumseh, NE.

3rd Annual Gateway Jet Rally: June 11-14, 2009
St. Louis, MO
www.SLRCFA.com

Mount Pleasant, TX Jet Rally: June 12-13, 2009
Mt. Pleasant, TX
CD: Gus Hudson
www.mtpleasantrc.com

OC-Turbo Fest-Early Summer Edition: June 20-21,
Titusville Airport; Titusville, PA

Jets over the Heartland: June 20-28, 2009
Winamac, IN

17th Annual Big Apple Jet Rally: June 27- 28, 2009
Brooklyn, New York

Jets over Kentucky: July 5-12,2009
www.visitlebanonky.com/events/kyjets.htm

Capitol Jets V: July 10-12, 2009
South Albany Airport, S. Albany, NY
www.capitoljets.com

Montana Jets: July 17-19, 2009
Kalispell, Montana
www.glacierrcers.org

Cincinnati Jets: July 24-26, 2009
Hook Field in Middletown, OH
CD: Gary Jefferson

9th Annual Liberty Bell Jet Rally:
July 30- August 2, 2009
Donegal Springs Airpark, Marietta, PA.
www.libertybelljetrally.com
CD: Mike Lesher

Michigan Jets Annual Charity Event : August 7-9,
Grosse Ile, MI
CD: Burt Eisenberg

Minnesota Jet Rally: August 13-16, 2009
Rushford, MN
CD: Dave Dennison
ddennison@yahoo.com

Windy City Jets: August 21-23, 2009
Fox Valley Aero Club Field, St. Charles, IL.
www.foxvalleyaero.com/

4th Annual New England Jet Rally: August 21-23,
Gardner Municipal Airport, Gardner, MA
http://groups.msn.com/barnstormers

Jets over Whidbey: August 28-30, 2009
Whidbey Island, WA
www.wircsrc.com.

CDs: Al Watson and Bob Brusa

Beginner's Corner

Bob Brusa

This section of *Contrails* is going to be devoted to the new turbine pilot. It is intended for those individuals who have not yet ventured into the arena of R/C turbine flying but are considering it, and to those who may just have recently entered into the turbine world. The plan is to have an article in each issue dealing with some aspect of R/C turbine flying. Like many facets of the sport/hobby of radio control, you will find a wide range of opinions, some good and some not so good. I will try to present only factual information so I don't ruffle too many feathers!

I have only been a turbine pilot for the last three years, but have been flying R/C for 31 years. Because I am relatively new to turbines, I think I can recall some or most of the information I was seeking when I started. Hopefully, this information will assist you as you begin your journey into turbine-powered jet modeling.

I'm sure many, if not all, jet pilots would recommend that you go to a local field in your area to watch, ask questions, and learn as much as you can from the local jet pilots. See what equipment they are using, which planes they are flying, and what recommendations they would have for you. If you purchase a turbine that no one else is using at your local field, then it is more difficult to get assistance from someone.

We are going to begin this first article with the turbine itself. Obviously, it is the most interesting to a new jet pilot, and the one item that is so different from anything else you have used for a power plant. When my first turbine arrived at my house, and I opened the box with great excitement, other than the turbine itself, I had no clue as to what most of the other parts were or what they were used for. So to get us started, we will discuss all the parts that come with most turbines, and their function.

Before explaining all the things that came with your turbine, let me recommend that once you are finished fondling your new toy, and showing it off to all the neighbors, that you read the owner's manual. There are various sketches included that will help you with your installation.

Obviously, the turbine itself is easily recognized, so no need to discuss it, however there are a couple of items on the engine worth mentioning. There are, today, two popular types of turbines, kerosene-start and propane-start. We are going to talk about the propane-start, as it is the most common. You should see what looks like a standard glow plug attached to the turbine. Actually, it is a standard glow plug and it is used to ignite the propane gas during start-up. Typically, the turbine manufacturers recommend a plug that has a heavier element, such as a Rossi no. 8 or McCoy no. 9, due to the heat generated in the combustion chamber. The other item worth mentioning is the exhaust gas temperature probe, commonly known as an EGT probe. This is a thermocouple, which looks like a stiff wire running down the length of the turbine. Its purpose is to measure the temperature of the exhaust gases exiting the turbine when it is running. We'll talk more about this later. Be careful that you don't damage this probe, it is somewhat fragile. Along with the turbine you should be provided a metal bracket of some sort. The turbine is mounted to this bracket, and then the entire assembly is mounted to your airplane, either internally or externally.

The next two items are probably the largest items, excluding the turbine. Different manufacturers call them by different names, but the jet pilots refer to them as the ECU (electronic control unit), and the GSU (ground support unit) or GDU (ground display unit). This is the common terminology, even though the maker of your turbine may call it something different.

The ECU goes inside the fuselage and is the "brain" of the turbine. It handles the starting, running, monitoring, and shutting down of the turbine. It will also shut down the turbine in the event of a loss of radio signal from your Tx (failsafe).

The GSU is external, and it is manually connected to the ECU to allow you to make any program changes to your ECU. The GSU will also monitor what is happening during start-up, while running, or shutting down. You can also use the GSU to initiate the start sequence. The GSU is disconnected after start up and does not remain with the aircraft during flight.

Another large item is the battery that powers the ECU, and other additional items such as the fuel pump, glow plug, and solenoid switches.

The electric fuel pump and solenoid switches (usually one or two will come with your turbine) are the next

Beginner's Corner (cont'd) — Bob Brusa

major items. The fuel pump is self-explanatory, it pumps the kerosene to your turbine. The pump has an electric connection to it and is connected to the ECU. It also has fuel lines connected to it - one to the turbine and one coming from the fuel tank(s). One solenoid switch is used on the propane line, and an optional one is used on the kerosene line. A clarification is needed here. Kerosene is called fuel, and propane (propane/butane also) is called gas. This was very confusing to me at first. Kerosene, or jet fuel, is called by its name or fuel, never gas, which always refers to the starting gas, or propane. The solenoid also has an electrical connection on it which is attached to the ECU, and two gas lines, one to the turbine and one to the gas source. If a second solenoid is used, it is in the fuel line, and it also has a connection to the ECU.

There are usually fuel lines and gas lines provided in your turbine kit. They are of different colors, usually, in order to identify them in your model. Not all manufacturers use the same size fuel and gas lines. They are typically 4 mm, but some use 3 mm.

The next items, usually referred to as Festo fittings, were totally foreign to me with my first turbine. They can be of any brand name, but the jet pilots always say Festo (like using the word Kleenex when you mean tissue). You will probably find several of these in your kit. They are used for attaching the various fuel and gas lines together (not to each other!). One of them should have a switch on it to open and close the fuel line. This is your manual fuel shut-off valve, a mandatory component. You might also have some smaller shut off valves that can be used on your propane lines. You probably will have a one way Festo valve to fill your propane tank, so that when you disconnect your propane source, the propane won't leak out.

There will probably be a small tank of some sort included that is used as propane (gas) tank. Some pilots eliminate the on-board propane systems altogether - no tank, no solenoid - and just hook their propane bottles to the turbine and manually feed the propane during start-up. I would not recommend this to new pilots. If your plane is small and you are at a premium for space, then eliminating the propane equipment is always an option.

Finally, you should have an assortment of wiring with various connectors on them. Commonly used wiring connects the EGT probe, the radio receiver, the glow plug, the turbine starter motor, the fuel pump, the battery, and the solenoid switches to the ECU. A turbine manual will also be included.

Next time we'll look at the starting procedure for a turbine and the safety precautions associated with start-up. Please feel to contact me anytime if you have questions or need further information.

Bob Brusa
Dist XI JPO Rep

District VIII Report (cont'd)

Barry Raborn's awesome looking F-9F *Panther*, getting ready for a flight

Phil Nuza's excellent flying BVM F-100

Officers and District Representatives

PRESIDENT AND WEBSITE MANAGER
Keith Sievers
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Craig Gottschang's Mibo A-10
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