The Seminole Flyer

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SEMINOLE RADIO CONTROL CLUB TALLAHASSEE, FL

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"The Seminole Flyer" is a publication of the Seminole Radio Control Club of Tallahassee, Florida

SEPTEMBER 2010

Alien Aircraft's Cessna 310B. Part- I Build.

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Letter from the Editor- Stephen Warmath

Actually, I'm kind of glad August is behind us. It was hot, I had some issues to deal with and we are that much closer to Seminole Football and cooler weather. Building in late summer has its share of challenges. Painting, covering and fiber-glassing require some special attention in the hot, humid confines of the man-cave. Resin kicks off faster than a hormone crazed FSU freshman, gloss paint takes on a dull appearance as it absorbs water vapor in the air and balsa sucks up moisture like a sponge making film covering difficult to set. But, I like a challenge so for this month, I have included a build series, **Part-I of Alien Aircraft's Cessna 310B**, a small, pretty twin electric. Good therapy here. We all have those used engines that we have acquired from others or our own that have just set up longer that we would like. This month's article **"Shop Prep for Engine Running"** has some tips on what to look for, fix and prep engine components for running it again. I hear it at most meetings. New members that have been out of the hobby for a fairly long time want to return to this great hobby. For you guys wanting to take the step into the future, **"Welcome Back-Part I"** is for you. **Part II** next month.

For the rest of us, it serves as a walk down memory lane revealing just how far we have come over the years.

Finally, Jim Ogorek of HobbyTown gives us an update on the latest stuff we can't live without.

Safe and Happy Flying- Steve

Chief Pilot- Mike Atkinson

Well, it has turned out to be one of those hurry up and wait situations with the electricity at the field. First, the good news: We have been able to get approval from our neighbors, the Sharps, to go underground with the electric line to the edge of the property. Next, the not-so-good news: They do no want anything additional placed on the property, so the Talquin transformer will have to be placed on the park side of the property line. Accordingly, Talquin will now need an easement from the county to place the transformer on the property. It should be just a formality, but cannot be done until the next board meeting of the county commissioners in September. The director of Parks and Recreation, Pat Plocek, offered to provide a letter of approval to Talquin so they could get started, but they need the actual easement before going forward. Last, back to the good news: The cost estimate was a little high. The club appropriated $8500 for the completion of the project. Based on received bids for the job, the cost should actually be around $7100! When is the last you actually saw something come in UNDER BUDGET?

As far as the solar power option goes, here are the numbers: The club voted to consider a solar option IF we could get a comparable system for at least $1000 less than the electric option. I received a quote for $11,440.00 for a 60 amp service BEFORE electric outlets installed. Our electrician submitted a bid of $1700 for installation of the electric outlets, bringing the solar option to over $13000. Therefore, as soon as we get the easement from the county for Talquin, we will move forward with electrical service installation.

We hosted our last museum aviation camp Wednesday, August 11th. Thanks to everyone who came out and volunteered to help. The kids and staff had a great time with everyone having a try at the club trainers. As usual, some struggled quite a bit while the occasional "natural" who picked up the controls quite easily. Hopefully, we can continue hosting these events next year.

Due to our lease agreement with the county, the airfield is subject to be closed for formal running events at the park. At this time, the county has requested the following dates: October 6, 2010 (Middle School Meet), October 8 & 9, 2010 (FSU Invitational high school and college), December 4, 2010 (elite runners invitational). The airfield may be open for a few hours each of these dates, but I do not have those times, yet. They have always protected our runway during these events, but it is always good to have one or more of our members on site to make sure overflow parking stays off the runway.

That's all I have this month. Remember, nominations for 2011 officers will begin at the October meeting. All offices will be open for nominations. Members will have to have been a member for at least 1 year prior to elections on December 2, 2010, to serve as an officer.

Happy Flying! See you at the meeting,
Michael Atkinson

Chief Copilot- Mike Kinsey

Club Calendar- The schedule reflects current Club events planned for the year to date. Check monthly for additions and deletions at the meetings and in the newsletter. For regional, sanctioned AMA events, see your AMA magazine or visit the AMA website section "Calendars".

September

- 2- Monthly Meeting at the Field 7:00
- 25- Club Fly-In

October

- 6- Running Meet
- 7- Monthly Meeting at the Field 7:00
- 8 & 9- Running Meet
- 16- Float Fly

November

- 4- Monthly Meeting at HobbyTown 7:00
- 20- Toys for Tots Fly-In

December

- 2- Monthly Meeting at HobbyTown 7:00
- 4- Running Meet

Chief Treasurer- Theo Titus

Editor's Note: The Treasurer's report is published for Members only. The public version of the Newsletter does not include account balances.

Seminole RC Club
Treasurer's Report

Period Ending	August 28, 2010
Checking Accounts	
Capital City Bank	
Premier Bank	
Savings Accounts	
Capital City Savings	
Premier Bank CD	
PayPal Account	
Funds for Deposit	
Petty Cash	
Total	
Checks Outstanding	
Net Funds Available	

Income	Expenses
Dues / New Memberships	Plaques and Awards
Activities / Fly-ins	Field Maintenance
Sales (Hats-shirts-etc)	Repairs and Supplies
Contributions and Donations	Miscellaneous Expenses
Interest on Savings	Meeting Food
Interest on Checking	Bank Charges
Total Income for Period	**Total Expenses for Period**

Chief Scribe- Geoff Lawrence

The August meeting was called to order at 7:10 pm on Thursday, August 5, 2010 by President Mike Atkinson. Welcome new members Don Willis, Robert Willis, Jimmy Alexis, and Eric and Melinda Milles.

Theo Titus read the treasurer's report. Motion to accept the treasurer's report was made, seconded and passed.

Geoff Lawrence stated the minutes of the July, 2010 meeting were posted in the current newsletter. With no questions or corrections a motion to accept the minutes was made, seconded and passed.

Old Business:

- Theo has created a new form for dues renewal for updating all required member data. New forms were distributed and are also available online. Please ensure Theo has your updated information.
- Mike Atkinson thanked Triston, Ernie, Mike Kinsey, and Geoff for repairing the fence burned in the shed fire.
- Phil Kreft with the FSU School of Engineering graciously thanked the club for our participation in the Aerospace Camp where we flew about twenty students on the club trainers. Phil presented a letter of thanks from the kids and reported the kids really enjoyed it. His Professor will be writing a letter of thanks that the club will be forwarding to the AMA.
- Mike A. presented an update on the electricity situation. Jim Ogorek is working with Talquin Electric and obtained an initial quote of $4700-$5000 to install their service. In addition we will require the services of a licensed electrician to attach to and install our pole. We've been quoted an estimated $2700 for that work. We discussed the need to obtain additional quotes to include a 100 amp fused service pole, lockable master shutoff, four quad outlets on the fence posts, and eight duplex outlets in the shed. The location of the disconnect was discussed. There is still an issue of our neighbors permission and County easements yet to be resolved but all parties involved are optimistic. We are currently awaiting final figures from Talquin and our neighbor's signed permission.
- David Settles brought up the issue of the County and FSU using our power. According to the County, we may charge a fee for their use.
- Theo expressed concern over our power infrastructure becoming property of the County. Jim Ogorek responded that the County is obligated to replicate any improvements we've made to our site if and when we're moved.
- Don Willis expressed how well solar is working at his home. Mike A. responded that solar is not cost effective for comparable power output.
- Mike Levine expressed concern over monthly charges. It is felt we will seldom if ever exceed the minimum monthly fee.

- Jim Ogorek summed the issue up with a best guess estimate of all charges including fees to be $8500. Mike A. pointed out the AMA will rebate to us up to 10% of costs for improvements.
- Chris Smith made a motion to appropriate up to $8500 for the installation of electricity from Talquin Electric. An amendment was proposed to the motion that we get a solar quote and if a solar equivalent can be installed for at least $1000 less than the final estimate for the electric service, we would go with the solar option. As original sponsor of the motion, Chris Smith accepted the amendment. The motion was seconded and by a show of hands, the motion was passed. Mike A. will obtain the solar quote.
- Dan Ouellet suggested we look into breaking up our Certificate of Deposit and having periodic rollovers. Theo explained we receive a better rate by leaving it intact.

New Business:

- Club member and State Fire Marshall Wallis reported both shed fire extinguishers are out of date and one appears to be discharged. Wallis recommended few larger ones over smaller extinguishers. Jim Ogorek will obtain them.

Announcements:

- Mike A. mentioned we are over half way through the current year and asked the Club to be thinking in advance of nominations for a slate of officers for next year. Nominations will be taken at the October and November meetings. The Club Secretary will select the nomination committee.
- Swap Meet and Fly In at Spence Field in Moultrie, Georgia this weekend.
- Seminole RC Club will be hosting the Tallahassee Museum Aviation campers August 12.
- Gordie Meade will be competing in the AMA Helicopter Nationals this weekend in Muncie, Indiana

With no more announcements or business, a motion was made to adjourn, seconded and passed at 8:06 pm.

Alien Aircraft Cessna 310-B Build Part I by Steve Warmath

I get most of the usual RC publications and all the ads beg for one's attention. We repeatedly see the same ones, same reviews, and as we process this information, we decide what to weed out and what to look at more closely. I never have paid much attention to the Alien Aircraft ads in the past. Their offerings, to me, seemed a bit average and minimalist in design. That changed when I saw the Cessna 310B as a "New" plane in their ads. I have always thought the 310 was a beautiful airplane and it goes all the way back to those early childhood Saturday morning shows of "Sky King" where I was glued every week to the television with my chili dog watching "Sky" and Penny busting the bad guys. It was stuff made of ritual. My mom always thought I was born with a propeller up my butt. I have to say, I think she was right.
Having seen this model kit from Alien Aircraft, I knew I had to have it. A pretty twin electric kit that would give me a good building "fix" was just what I needed.

The Specs:
Designed By Tom Herr

216 laser cut parts

4 Channel R/C (mini radio reqd.)

Wingspan = 42.2 " Area = 262 Sq.
Weight = 21 oz.
Wing Load = 11.5 oz / Sq.'

Power:
Two Himax HC-2212-1180 Motors

Battery:
3 Cell, 1250+ mAh LIPO

The kit does not come with printed instructions. They must be downloaded from Alien's web site. The instructions are very well done with lots of pictures, which I like. The kit arrived in a standard postal box. The laser cut wood was neatly stacked in a plastic bag along with 3 sheets of CAD drawn reference drawings and another bag of hardware. Before you start pulling everything out of the bag, a word of caution is needed. The laser cut parts are so well done, as soon as you start separating sheets, the unmarked parts star falling out of their sheets. You then have to compare parts with the instruction illustration of the laser cut sheets to figure out the part numbers. I would suggest that you mark part numbers on each sheet with a pen before you start pulling the sheets apart. It will save you some time when they fall out and you'll know the part number when needed.
The basic construction method is tab and slot joinery. I build on glass so it's easy to clean up during construction. A little wax paper, some lead weights, a modelers square, some fast CA glue and you can make quick progress. I pretty much followed the instructions as written. I considered adding nose wheel steering to the model, but after studying the geometry of what would be required and space available, I decided it was not worth the extra fuss. At the end of step 34, I decided it would be a good time to paint the cockpit area gray before adding the top cockpit stringers. I hate to see bare wood on a model, particularly in the cockpit and engine compartment. Nacelle construction was pretty straight forward and well designed to achieve the desired results. Cutting the kerfs in the side joiners was a

little tedious but goes fast with a razor saw. I filled any uneven areas of the model with light weight spackling and sanded smooth.

Four areas of the model require shaping from laminated sheets. The wing tips, the nose, the engine nacelle cowlings and the front canopy brow. Using a sharp, new surgical #11 blade makes the job a bit easier. Proceed carefully with sanding to final shape. It's easy to take off, harder to put back on. I decided after shaping these parts, I would fiberglass the tip tanks, engine front nacelles and the nose for two reasons. I would have a nice slick painted finish and one that would be very resistant to dents and scratches.

Wing construction is straight forward and easy to build. One thing to keep in mind that you will discover later is that the solid sheeted areas of the wing are nestled **between** the stringers, not on top. So if you get ahead of yourself and think you need to sand the stringers flush with the ribs, **don't.** The sheeting in these areas is very thin. If you have heavy fingers, you could be doing some repairs as you go. At step 106, I decided not to install the wiring reinforcing pieces as they would just be in the way when I covered the wing. I'll put them on later, after the film is down or I may decide to leave them off and reinforce the openings with CA. I also decided not to join the wings as suggested in step 111 until the covering is on.

The ailerons are pretty cool in the way they are built. I added thin end pieces and sanded them as necessary to close the gaps as needed for a tight fit.

I made my shopping list for motors, ESC's and motor stand offs. I ordered the motors and ESC's through HobbyTown vs. Alien Aircraft and saved money. I did get the motor standoffs, motor wire extensions, props and prop hubs from Alien as they were sized and designed specifically for the Cessna. My next installment will be made next month in PART II where I'll complete the covering and painting of the model and basic installation of the electronics. I'll probably end up with a short PART III covering final equipment installation and a flight report.

Model Airplane News will have a product review of this plane in the near future. Stay tuned for more.

Steve

Shop Preparation for Engine Running

When we acquire a used engine that flips over okay, and generally looks and feels like it should run, it will usually do so. But, about half the time it may need some tweaking to exercise some little problem that made the owner sell it. For this, a good mechanic is more helpful than a priest. For those of us who can't or don't like to run 'em at home, there are some basic things to check out before taking it to the field running session, and maybe being disappointed.

Checkout amounts to more than seeing if an engine props over okay and a glow plug lights. If the engine is stiff or frozen up you'll need to loosen it first thing. A glow engine was no doubt run on glow fuel, but if it's a sparker, it might have been run either on gas and oil or glow fuel. A glow plug in the head and a missing timer is a pretty good clue. A further test is to use a little of each fuel on a rag to wipe away some of the goo. The fuel last used will dissolve any residue the easiest. So, as a minimum pull the plug and flush things out with a fuel or solvent of the same base as the fuel last used. It may require soaking. A frozen engine can usually be loosened with a propeller installed and a heat gun applied. How much pressure you can put on the propeller without breaking anything is a matter of experience. (If something breaks, you used too much pressure.)

If the engine has ball bearings they need to be checked more carefully once things have been basically loosened up. With no propeller installed, rock the crank back and forth with the piston down below the exhaust opening. Carefully feel and listen for any bearing roughness. More soaking, or even disassembly may be needed. That's because congealed oil and/or even rust may be present. Congealed oil can make bearings skid in their races on startup and scuff the races or flat spot the balls. Sort of like losing your skateboard halfway down the steel handrail. Rust can be even worse, because it's abrasive and can grind up everything inside. Rust has to come out and new bearings may be needed. Fortunately, an old sparker that was last run on gas and oil is much less likely to have internal rust, or even bearings.

Most used engines are usually in really bad condition. Probably the most common reason an older engine won't start right away is poor or no fuel flow. Put a foot-long piece of fuel tubing on the spray bar, blow through it and listen. You should be able to close the needle so that no hiss is present, then open it and hear the progressive hiss of flowing air. If not, use fuel to flush things out with the needle both in and all the way out. Check alignment of the spray bar. Best position for the outlet orifice is at right angles to the venturi's air stream or slightly downstream of that position. If you look into the intake and can't see the orifice looking back at you, you're probably okay.

Select the propeller you're going to use, install it, and flip the engine over to make sure the hole size is correct and the propeller nut and washer clamp down all the way.

Points on a sparker often have congealed oil, a misadjusted gap, or other problems. Check that points work by simply installing a continuity light or Ohmmeter between ground and insulated point. Slowly rotate the propeller and see that the light or meter kicks on for almost half the revolution. Check and set the timer advance at this time. Rotate the piston to top dead center by feel, or by peeping into the exhaust. Note the propeller position, and rotate it backward, and watch for the light or meter to kick on at about 20° before top dead center for easy hand starting.

Make sure you have a clean tank and filtered fuel. And if you have an external tank, or at least an external fuel line, using an inline fuel filter will eliminate a lot of potential problems. Check all screws for snugness to be sure someone didn't leave something loose at some time.

For hand starting, a heavy leather glove is a good idea. An out-of-time, or leaking crankcase on an Ohlsson using gasoline can bang your fingers as unmercifully as anything you'll ever encounter. Follow these steps as a minimum and you've just improved your odds of getting things running during the first attempt. ✈

Welcome Back! We Missed You! Part One

We are glad you have decided to return to the exciting world of Model Aviation. We have missed you and have kept a lamp in the window, hoping you would come back someday. I know how you feel right now; eager to get started again but concerned about the many changes that happened while you were with us only in spirit.

A lot has changed since your last flight. The photo above is but a small example of those changes. The green/yellow 50-inch biplane on the left is a Lou Andrews designed Aeromaster. I built it in 1980. Notice that it is glow powered with an HP 61 engine, one of the first Schnuerle ported .61 engines. The wings are held on using rubber bands, there is no rigging and the airplane weighed 7.25 pounds. It took 4 months to build. Despite its lack of sophistication, this airplane won first place in the 1980 WRAM Show Biplane category! Including the kit, covering, paint and hardware, its airframe cost about $165 1980 dollars.

The 50-inch Jenny on the right is an Almost–Ready-To-Fly ARF from Green RC. Its review is in the January issue of Model Aviation. The airplane required only a few hours to assemble, is E-powered with a strong outrunner, will out climb the Aeromaster and has full rigging. The wings arrive attached with struts and all rigging in place. The rudder and elevators are controlled by pull-pull wires as on the full-size airplane. It weighs just 2.38 pounds. For me, it is near a scale masterpiece. Yet its airframe cost is just $220.

These and other changes make this a most difficult time to return but also the most rewarding. As I said above, I had to stop flying models, except for one or two flights annually, for seven years; 1986 to 1993. During those awful years, my job responsibilities grew exponentially as did my income. But always, *something was missing*.

Maybe it was the great people in modeling, or was it the satisfaction of building and flying your own creation? Was it just the missing relaxation (nervous exhaustion?) of the sport or the sense of accomplishment felt when meeting self-imposed challenges such as the first flight on a new airplane or flying that perfect loop? For whatever reason, those few annual visits to the flying field, with my single remaining airworthy airplane (a SIG Kougar *given me* by a sympathetic friend), were always my annual highlight.

Photo 1

Finally, my great wife Ann could stand it no longer. She strongly suggested that I start flying again, quickly. So, I started back flying that old Kougar in 1994. But those years that I had missed were model aviation's "transition period" and there had been a lot of changes.

ARF's had started and had become ever more common during those years. Computer transmitters began changing the way airplanes were designed and flown. Servos became powerful and airplanes got a LOT bigger. Engines followed the march to larger sizes while increasing reliability made the bigger, more expensive airplanes practical. Pattern competition airplanes went from 60-powered ballistic missiles to larger, slower flying, true aerobatic precision instruments.

There was a lot of catching up to do and doing so required at least a year, maybe a little longer. Today, changes are even more numerous and the learning curve is steeper. Even three years of "MIA" in the modeling world today means that the returning pilot has basically missed the E-power revolution and the practical revival of neighborhood Park Pilot flying.

Just less than half of Sport Aviator readers are pilots now returning to the air. Many have been missing for five or ten years. Our record so far (based upon reader letters), is one pilot coming back to us after having been away for 47 years! The average time away, at a guess from the letters received, is about 12 years.

A lot has changed in the RC world in 12 years. There have been technical changes of course. But also whole new styles of flying, new competition classes, new trimming requirements and a sea-change in attitude have also become dominant. We'll try to delve into each change as much as possible. Doing so with a few of the less objective changes, such as attitude, must contain some opinions. I will identify those instances as such and try to present all sides of a given change as much as possible.

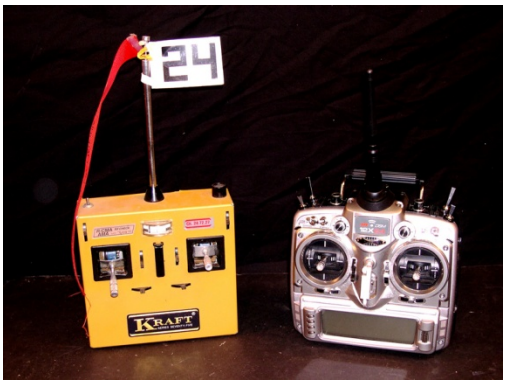
Technical Equipment Changes: Radio Systems

Transmitters:

Photo 2

The most obvious change in the last 12 years is in the equipment. Engines, radios and airframes have undergone gigantic developments. Let's look at radio systems first: Ignoring the presence of a lot more

buttons on the newer JR 12X transmitter than on the 1974 Kraft KP7Z unit, check out the antenna differences. The Kraft transmitter has a retractable metal antenna about 3-4-ft. long. The 12X's antenna is a non-retractable, composite unit just a few inches long. This is because the 12X transmits on 2.4 GHz while the older Kraft sends out its orders on the 72 MHz with which we older pilots grew up. But the real difference is in the way the units work.



The 72 MHz transmitter sends out information on one of 50 different frequencies. The frequencies are closely spaced but discrete. Some are on the FM band and some transmitters use the AM band. Some (not this Kraft unit) are the newer Pulse Code Modulation (PCM) digital conversions of an analog signal that provides clearer signals and best utilizes the new digital servos.

But the old problems of interference and getting an available frequency remain. PCM has the added disadvantage in that the conversion from analog to digital and then back again in the receiver requires extra time which results is increased latency periods. The latency period is the time between when the transmitter "stick" is moved and the servo starts to respond. However, PCM gives a very tight transmitter-receiver bond. This bond can be interfered with but only with some difficulty.

Photo 3

Enter the new 2.4 GHz systems. They operate on numerous channels is the 2.4 GHz band, probably around 80 channels. But the pilot has no say in what channels are being used. Futaba, Airtronics and HiTEC transmitters "frequency hop" through all the available frequencies during a flight. Each frequency is "used" for only about 0.6 seconds. Federal regulations *suggest* that any 2.4 GHz frequency currently in use be left out of the hopping rotation, but that does not always happen. Even if two transmitters happen upon the same frequency, the "conflicting" time unit is so small that interference is unlikely. Also, each transmitter sends an eight or ten digit code to the receiver and the receiver will listen *only* to signals employing that code. Interference is virtually impossible.

Photo 4

Spektrum and JR transmitters do not hop frequencies but grab two unused frequencies and transmit on them. These transmitters do avoid "channels" in use and will only lock onto open frequencies. These transmitters use a 10-digit identification code. They both use a technology called Model Match® which allows the receiver to obey its transmitter's commands if, and only if, the pilot has selected the correct model from the transmitter's memory. This feature has saved me twice in the past few years.

For complete information about 2.4 GHz, read the Sport Aviator articles "2.4 GHz for the Common Pilot" "2.4 GHz Radios" and "Spread Spektrum – Are you ready for full range" in the Flight Tech Section. For now, know that 2.4 GHz eliminates interference, shortens latency periods, eliminates frequency congestion and is fast becoming the norm in RC. I am having difficulty even *giving away* relatively new and operating 72 MHz systems.

Computer transmitters were around 12 years ago but not as sophisticated and capable as they now are. They also cost a bundle in 1997. Almost all transmitters sold today are computer driven to some point. Even budget-priced 4-channel units are available and very inexpensive. 2.4 GHz transmitters like the Spektrum DX5i and DX6i, Futaba 6 and 7 FASST units and Airtronics 8000 are great 2.4 GHz units that cost less than $200. A little known fact is that transmitting on 2.4 GHz requires much less transmitter power than does 72 MHz. Therefore, transmitter batteries can be only 6-volt units (like the old Royals from the early '70s) and use dry-cell batteries. My DX6i transmitter has been using the same four dry-cell batteries since last year and, after 100+ flights, still produces 5.9 volts under load.

Basic computer transmitters allow choosing servo directions, servo travel, a thing called “sub-trim” which allows servo center point adjustment, dual rates on elevator and ailerons that limit how far these servos move at full deflection, exponential which permits smoother flights by limiting travel around the neutral point while still allowing full control surface deflection, V-tail and dual aileron servo mixing. Some, like the Airtronics 8000, even allow for mixing control surfaces such as the rudder with aileron, flaps with elevator or elevator with rudder to fly those straight knife-edges.

If you are not a computer “genius” as I certainly am not, do not be concerned. The menus take the pilot step by simple step through every setup procedure. Today’s basic computer transmitters are simple to operate and represent about 90% of the new transmitter market. They are a must for any returning pilot. Learning to program even the most complex computer transmitter, such as the Futaba 14Z or the JR 12X, is about the simplest computer task possible. It is certainly easier that working Excel!

Recommendation (my opinion)? If you are going to buy a new radio system, choose a basic 6-8 channel, 2.4 GHz system that includes sport digital servos. The street prices for these systems are less than $250 and they are designed for those new to RC. They are easy to set up and program. The extra channels allow for growth when it is time for retractable gear and flaps. The sixth channel also allows for using a separate servo on each aileron (more later).

Futaba FASST Systems and Airtronics are frequency hopping systems. JR and Spektrum transmit on two available 2.4 GHz frequencies for the entire flight. Both systems have proven to perform equally well in the field. Which one is pilot’s choice. Check Sport Aviator’s Radio Stack Section for individual radio system reviews. The Airtronics 8000 review even features videos of some of the programming operations.

Photo 6

Photo 7

If you already have a more complex computer transmitter on 72 MHz such as a Futaba 9Z or 12 Z, JR 8103 or 10X, you may want to keep the transmitter and just convert it to 2.4 GHz as shown in the photo above. Any transmitter that uses a module, not just a crystal, can be converted.

Converting the transmitter allows keeping your complex programming, trim and setup for each particular model while still enjoying the benefits of 2.4 GHz. If you had been using such an advanced transmitter, that usually means you had been flying more complex, read more expensive, aircraft. It might be a good idea to extend 2.4 GHz’s interference protection to these more expensive aircraft.

Conversion sets include the transmitter module and one receiver. If the transmitter operates more than one aircraft, a separate 2.4 GHz receiver is required for each.

Servos:

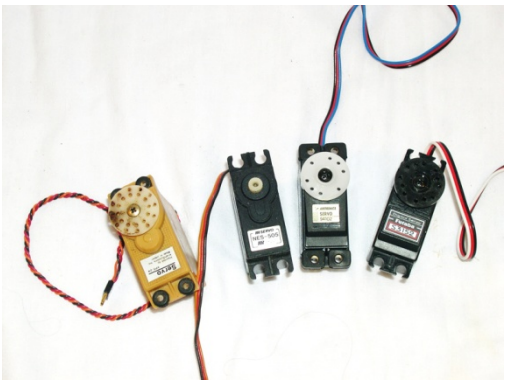


Photo 8

Looking at just the specifications, sport servos don't appear to have changed much over the last 12 years. But they have. True, 30 years ago the strongest sport servos produced only about 26 oz. /in. of torque while taking about 0.4 seconds to move 60 degrees (Kraft servo on left). But even by 12 years ago, sport servos routinely produced 45-65 oz. /in. of torque while speeding up to .22 seconds/60 degrees (JR 505). Today's standard sport servo specifications are about the same, maybe a little faster at .20 seconds (Airtronics 94102) but no major differences.

The big servo advance in the past 12 years has been the introduction of the digital *sport* servo. Priced in the $30 range, these sport servos are extremely precise and more durable. The durability comes from the ball bearings, instead of nylon or metal bushings, that support the output shaft (where much of the stress is). The servos also use less current to move because of the ball bearings and they last longer as well.

But the big news is the increased, really increased, resolution and precision of digital sport servos (S 3152). 12-year old sport servos have a resolution, how many separate "steps" in 60-degrees of movement that the servo could sense or stop at, of 340 (guesstimate) . No matter how precise are the transmitter and receivers, the servo could not divide its movement into more than 340 steps and that means less precision. About 10 years ago, servo precision increased to 512. 512 at least matched the common sport transmitter's and receiver's resolution.

Today's common digital sport transmitters and receivers have resolutions of 1024. Some, like the Spektrum DX7 Special Edition MD-2 have 2048 resolution but at a higher price ($320). The greater the resolution, the smoother and more precise is the flying experience. Especially important to all aircraft is the increased centering resolution.

For best results, a servo must center as exactly as possible. This is mostly a function of the system's resolution. But the servo must be at least capable of that many discrete steps for best results. To take full advantage of a system's increased resolution for the best centering, a digital servo is required.

A digital servo is capable of resolutions of at least 2048 and even greater if the system can produce that much exactness. They can "stop" anywhere (almost). Digital servos have precise centering; every time. This precision operation, along with its increased speed, provides the tightest pilot connection to the aircraft.

(**Opinion**) Considering how cost effective digital servos are for their increased performance and durability, there seems little reason to not use them. If I must scrimp, such as on 10-servo airplanes like A-26 Invader or big P-47D Thunderbolt, the older, non-digital servos go on the throttles and retractable landing gear switch (A-26). The flight surfaces, especially the flaps, all enjoy digital precision.

Receiver Batteries:

Photo 9

20 years ago, Nickel Cadmium (Ni-Cd) batteries were the norm for both the transmitter and on-board batteries. They were reliable, easily re-charged, light weight and had capacity ranges, (how much work they could do) in the 450 to 900 milli-Amp hour (mAh) range. Most sport airplanes of that time had just four servos and used less than 100 mA per flight. Today's sport airplanes use 5 or more servos and draw about 150 mA per flight.

Computer transmitters, especially those on 72 MHz, use more power than the older units. The older transmitters used batteries around 500 mAh and would transmit for at least 90 minutes, usually more.

Radio systems today use on-board Ni-Cd batteries in the 1100 mAh range and computer sport transmitter batteries have capacities around 850 mAh. If you plan to use your older radio equipment, you *must* replace both batteries for maximum safety. But before you do, remember that Ni-Cd batteries have one major RC disadvantage.

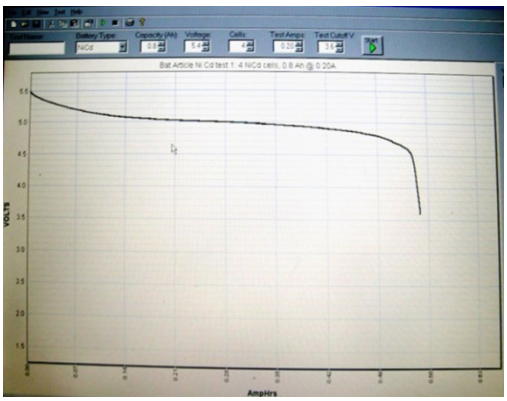
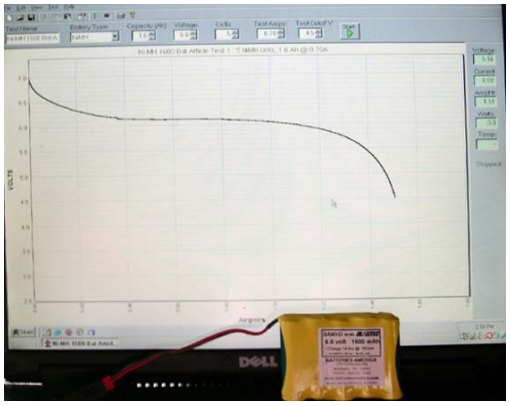


Photo 10

When Ni-Cd batteries were all we had, they were OK. However, their one flaw, as far as airborne RC is concerned, was a real killer. Look at photo 10. This is an actual discharge curve, made using the West MountainCB II battery analyzer, of a one-year old 800 mAh Ni-Cd battery pack that is in good shape. After the initial high surface charge dissipates, the voltage remains fairly flat for most of the curve. This is perfect for RC use as the receiver stays equally energized and the servos have basically the same response rates for most of the flights.

However, when time is up the Ni-Cd's voltage literally falls off the proverbial cliff. In just seconds, the voltage drops from a useable, 4.6 V, to a "pick up the pieces" 3.6 V. In short, when Ni-Cd batteries reach the end of their capacity, voltage drops so fast it is nearly impossible to save the airplane. There is little warning given to the pilot.



Ni-MH discharge curve

Photo 11 is the discharge curve from a 6-volt, 1600 mAh Nickel Metal Hydride (Ni-MH) battery. When the Ni-MH battery reaches the end of its useful capacity, the voltage drops much more slowly. Instead of quitting entirely, the servos slow down. This warns the pilot it is time to land. Since there is still enough voltage remaining, even with a 4-cell, 4.8-volt Ni-MH battery pack, the receiver continues to work and the pilot has sufficient time to safely land the airplane.

Ni-MH batteries have more capacity for the same size cell than do Ni-Cd batteries. Notice that the smaller, 5-cell 6-volt Ni-MH pack on the bottom still has 720 mAh capacity despite how much smaller it is than the 4-cell, 4.8-volt, 700 mAh Ni-Cd to its upper right. Since the Ni-MH cells can be smaller than the Ni-Cd cells for a given capacity, the Ni-MH battery pack is also 1.8 oz. lighter. Ni-MH battery packs can use the same chargers used for Ni-Cd batteries including those included with most radio systems.

(Opinion) With more capacity for a given weight and the ability to save an airplane, my suggestion is to use Ni-MH batteries for all airborne packs. Since you have to buy new batteries anyway, and the costs are the same, use Ni-MH airborne battery packs.

I have real world experience about this saving the airplane thing. I improperly charged the on-board Ni-MH battery pack in my expensive Prophecy Pattern airplane. On the third flight of the day, the aileron response suddenly slowed dramatically. It took me 2-3 minutes to realize what was happening, and then 3 more to land the airplane. I still have that airplane but I would not if those batteries had been Ni-Cd's.

Here is a special note on the voltage needs of 2.4 GHz receivers. Most such receivers need at least 3.8 volts to work properly. Older receivers would work down to about 3.4 volts, but with reduced range (so "they" tell me but I have never experienced or measured that). If all four servos (5 with dual aileron servos) are moved at once, as would happen when performing a snap roll, it is possible for a 4-cell battery, on the last flight of the day, to momentarily drop below 3.8 volts. The receiver could momentarily stop working and could require a short time (as much as 1 second) to reboot. That could be the longest second in your life if the airplane is headed downwards when it happens.

While this is not as critical as it once was, when reboot times reached 3 seconds, this situation should be avoided. For 2.4 GHz radios, try using the common 5-cell Ni-MH battery packs. They will never reach below 3.8 volts in normal flight. If they do, 3.8 volts will probably not be your major concern as something has just shorted out!

To sum up this radio section, the last 12 years has brought the following suggested changes **(opinions again)**:

- ✦ For new radio systems, purchase a 2.4 GHz, basic computer transmitter in the $150 to $230 range.
- ✦ If you already own an advanced, 72 MHz transmitter with several airplanes in memory, convert it to 2.4 GHz when economically feasible. Protect your expensive investments.
- ✦ If you have a good, narrow band 72 MHz radio system and want to use it, replace the batteries even if they have been unused for only 2 years.
- ✦ Use digital sport servos for airplanes up to 9 pounds. Larger, more sophisticated airplanes use premium servos that cost around $80 to $120 each. Such airplanes are outside the scope of this introductory article.
- ✦ Use Ni-MH airborne battery packs with the largest capacity the airplane will comfortably carry. This is usually 1650 mAh. Use 5-cell packs with 2.4 GHz systems.

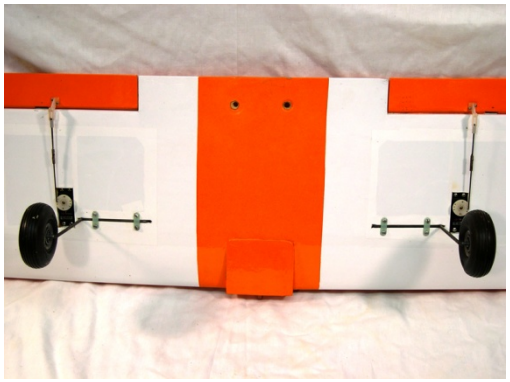


Photo 12

The next article in this series will cover changes in airframes, design performance improvements, modern engines, flaperons, dual aileron servos and more. Dual aileron servos have revolutionized aircraft trimming and are something we *should* have discovered when computer transmitters first arrived. The final article will cover newer competitions, the E-Power revolution, how local flying sites are changing the sport, Park Pilot aircraft and modeler's attitude changes.

HobbyTown Corner by Jim Ogorek

Real airplanes have round engines and two wings, an old adage that really does say it all for those of us that have been around for “awhile”.

For those who are the next generation and those of us still young at heart, E-flite has a very interesting model to cover this adage.

Pitts Model 12 15e ARF

The E-flite® Pitts Model 12 15e ARF is an aerobatic capable, sport replica of one of aviation’s hottest aerobatic machines. Designed by veteran, world-class competitor Quique Somenzini, it will give intermediate to expert pilots a thrilling scale aerobatic experience unlike any other. The large wing area and light wing loading of its biplane design offers very forgiving flight characteristics while keeping roll response crisp and precise. E-flite’s Power 15 and Power 25 brushless outrunner motors are excellent power choices, depending on your skill level. Sport or scale aerobatics, the Pitts Model 12 15e will do whatever you ask and will look good doing it.

Its feature-packed design and components offer a level of quality and performance beyond that of any similar models, allowing intermediate pilots to grow their skills rapidly and experienced pilots to enjoy maximum performance with no extra effort. With E-flite’s high level of pre-fabrication that has been completed, modelers will have the ability to fly this incredible biplane with minimal hassle and maximum fun.

Product Specifications

Wingspan:	40" (1015 mm)
Overall Length:	39" (990 mm)
Wing Area:	555 sq in (35.8 sq dm)
Flying Weight:	48 - 50 ounces
Motor Size:	Power 15 BL Outrunner, 950 Kv
Radio:	6 channels with mixing
Servos:	Sport (4)
Trim Scheme Colors:	Ultracote White (HAN870), Ultracote Black (HANU874), and Ultracote Cub Yellow (HANU884)
Prop Size:	APC 12x6E
Hardware Included:	yes
Speed Control :	E-flite 40A Switching BEC
Recommended Battery:	14.8V 2070 mAh 4-cell Li-Po battery
Approx. Assembly Time:	4 - 6 hours

Want more information, stop in and have a look, pictures don’t do this airplane justice.

Seminole Radio Control Club
Tallahassee, FL
AMA Charter #216, 1969-2010

SRCC Officers
President – **Mike Atkinson**
Vice President – **Mike Kinsey**
Secretary – **Geoff Lawrence**
Newsletter Editor – **Stephen Warmath**
Treasurer – **Theo Titus**
Field Safety Officer- **Jim Ogorek**

Field Hours
Electrics/ Sailplanes- 9:00 am till dusk.
Gassers and Nitro- 12 Noon till dusk.

Training Notes
To schedule a training time contact Mike Atkinson.

Flight Instructors

Mike Atkinson- Primary/ Advanced Fight Instructor (Coordinator)	926-4692
Geoff Lawrence- Primary/ Advanced Fight Instructor	942-9807
John Hall- Primary/ Advanced Helicopter Flight Instructor	893-6457
Jeff Owens- Ground School/ Airworthiness Instructor (Fixed Wing)	894-2504
Frank Bastos- Hobby Town Flight Demonstrator	671-2030
Jim Ogorek- Primary/ Advanced Fight Instructor	766-2477

Club Meeting Location and Time

November- March: The regular club meetings are held on the first Thursday of each month at **7:00 PM** at **HobbyTown** on Thomasville Road. The Club offers food and drinks for a small charge at 6:30.
April- October: The regular club meetings are held on the first Thursday of each month at **7:00 PM** at the Flying Field. The Club offers food and drinks for a small charge at 6:30.

Newsletter Submissions- Submissions are requested to be in M.S. Word format or via e-mail text. Photos should be in .jpg or .tif format. Vector art accepted in Corel, Illustrator and AUTOCAD format. We will, however, accept anything to make it easier for those who wish to contribute. Submissions are due no later than the 28 th of the month. Send your submissions to Stephen Warmath sswarmath@comcast.net