NARCA Eagle

Volume 2016-09
September 2016

North Alabama
Radio Control Association
P.O. Box 173
Harvest, AL 35749
http://www.flynarca.com

Next Meeting

Place: IHOP, Madison
Date: Thursday October 13, 2016
Time: 6:30 PM
Program: TBA

Upcoming Club Events

October 6-9 – Aerotow, Epps Airpark

Eagle Droppings From the President:

Our intrepid newsletter editor has informed me he has a lot of input this month, so he asked me to keep it short.

Read Chuck's flight review of his P-38. It's a great flying plane that presents some challenges keeping orientation due to its unusual lines.

Don has an excellent article about batteries; it has some great information about the need for proper testing with the right equipment, and an unfortunate result of not doing so.

The nominating committee's slate of officers for 2017 will be presented at the October meeting. Anyone who wishes to be considered for an officer position can speak up at that time, or you can get in touch with Bill, Larry, or Kevin and let them know. Officer positions are not that labor intensive.

THE AEROTOW IS THE 6TH - 9TH OF OCTOBER. This is our premier flying event of the year and we get people from across the Eastern half of the country attending. Our contestants have appreciated our Southern hospitality and I would hope that will continue. If you have any time during the event please come out to the field and help out. The workload is usually light, so if there isn't anything to do enjoy the flying. ***SETUP IS WEDNESDAY, OCTOBER 5TH, AT 1PM***. We can use a few backs to help out for setup Wednesday and tear down on the 9th after the flying is over. Bring a plane so you can get some flight time after the work is done.

Decatur's fall swap meet is coming up on the 15th of October. http://www.ourdmac.com/ will give you the info you'll need.

See you at Aerotow! ✈

Rick Nelson, President

Membership (Second Vote) October 2016 Meeting

- Thomas Borders, Eddie Denney sponsor

Reup Time!

Members, October is the ideal time to submit your renewal for your 2017 NARCA membership. Your early submission will help us with our annual budgeting process. Check the website to download the renewal form. ✈

Archie Phillips

9 September 2016 General Meeting Minutes

Meeting called to order at 635 PM by President Rick Nelson at the Madison IHOP Back Meeting Room.

Attendees: Jerry Conrad, Chuck Pierce, Rich Lawrie, George Rittenhouse, Gary Suckow, Tim Batt, Don Apostolico, Ciff Lanham, Rick Nelson.

Minutes of previous NARCA General Meeting were approved as published in the NARCA Eagle Newsletter.

Officers' Reports: None.

Old Business

- **Votes.** There were no second votes this month due to non-renewal.
- **Aerotow.** To-date we have six pre-registrations for the October Aerotow.

- **Moontown.** The NARCA Moontown display was cancelled due to non-participation.
- **Swap Meet.** The NARCA Spring Swap Meet was locked in for April 1st with setup on March 31.

New Business

- **New Flying Field.** There was more discussion on the need to keep an eye out for a new field.
- **Phone Scams.** Not related to NARCA but a good discussion point anyway.

Meeting Adjourned at 7:30 PM.

No program was presented. ✈

For the Secretary,
Rick Nelson

Don's Flight Tip #9

Are You Battery Smart?

The observant reader has probably noticed by now a theme to my flight tips. ~ ***Safety*** ~

Full scale aviation knows that when you take safety for granted that's when accidents occur. When one assumes everything will work all the time and doesn't check, that's when accidents happen. The full scale industry learns from each crash, documents details and disseminates the information so the cause of the crash will not be repeated. The modeling world by contrast, often depends on well-meaning but sometimes misinformed opinions, or threads on the internet. When repeated enough fiction often becomes fact in the minds of those who don't know. This misinformation or lack of information, when applied by others who don't know the facts, often results in fulfilling the old modeling cliché that sooner or later all planes crash. Please don't misconstrue these comments to be criticisms of the many wonderful people who are trying to help others. These are merely observations of a basic misinformation problem that continues to be passed on to each new generation of modelers. The problem is solved with correct information and education.

Why shouldn't modelers take a page from full scale aviation and apply the safety concepts that allow full scale planes to fly for decades and safely land even when equipment failure is experienced? While there is no perfect world, a full scale accident is a clear exception rather than the rule. In the modeling world crashing is a common occurrence rather than the exception as models crash planes for the same issues that have crashed so many planes over the decades. One of the top technical reasons for model crashes is battery failure.

Excluding pilot error (a training issue), battery failure has been the leading technical cause for crashes almost ¾ of a century . The good news is that battery failures can often be detected before they occur if the modeler is "battery smart" thus preventing a costly and avoidable crash and more importantly avoiding danger to others. Lithium ion, nicad, nickel metal batteries and Li polys will be covered in this tip.

Are you Battery Smart?

- Do you check the status of your batteries ***under load*** before take-off? Knowledgeable modelers do.
- If you fly lipos do you check your cells with a lipo tester that checks the cell voltage and resistance of each cell before and after you fly?
- Do you check the status of your batteries under load ***after you land?*** You may be surprised at the reading.
- Do you carry dual batteries on larger aircraft for safety?

Did you know that slow charging is battery friendly while fast charging any type battery reduces the battery life span because of the heat generated by the quick charge?

One lesson the industry has learned is that load testing, or on li polys, using special battery testers that measures each individual cell voltage and resistance, before and after flight, will reduce the chances of a catastrophic power failure because you see the trend lines and catch the problem before rather than after it fails.

Most would agree that it just make sense to learn from other people's mistakes and not repeat them? You just have to know how to do it and what to look for so join me in reviewing the following information which will present information to hopefully help your knowledge of the batteries we use to power our planes.

Ever wonder why many don't check batteries before flight? Here are a few of the reasons I've heard: Have you heard or thought this before?

- I didn't check it because I just charged my batteries. --- Response: This thought process improperly

assumes that because the batteries were on the charger they must be charged. That's a bad assumption to make. What about a defective charger that doesn't charge properly?

- What about a peak detection charger that cuts off early leaving the battery partially charged? – What about a bad cell in the battery that didn't charge so only 2 of the 3 cells (lipos) or on nicad or nimh 4 of the 5 cells charged? One assumes that all the cells are good, therefore, some modelers don't check the battery before flight to see if it's safe to fly.
- Some say, they have been flying for years and don't test because they have never had a problem: Response: While not everyone will have a battery failure don't assume that you never will. I agree that our equipment is pretty reliable but the problem with this assumption is that it's diametrically opposed to the 75 years of RC Industry experience that knows battery failure is the leading technical cause of crashes and that preflight and post flight testing has taught us that we can identify most of these issues before they fail.

While electric airplanes employ a cutoff which shuts the motor down keeping current flow going to the radio, that of course, assumes the battery doesn't fail completely and the cut off circuit works correctly. In the brief time I've been a member in our club I've seen 3 members electric planes experience control problems where the member suspected a faulty or intermittent speed control or battery issue. Which is it? You won't know without testing. How do you fix it if you don't test? Just remember, anything electronic can fail anytime. You can't be too careful. The following will illustrate the point.

The photo above shows my 40% Carden Extra 330 that was charged at the house and before putting the plane into the van I load tested the batteries. All 3 airborne and ignition batteries checked out fine. I got to the flying field, put the plane together and gassed up. One last check of the batteries before I started the engine. **Holy Dead battery!** In the 30 minutes since I last tested the battery under load this $130 dollar battery pack on a $7000.00 aircraft went from fully charged to 0 volts. For safety, I carry dual airborne batteries, receivers and switches so if this failure occurred in flight I wouldn't know it until I landed and checked the post flight voltage. What if a cell had gone dead and the battery had just enough power to get the plane in the air and then go off line? One wouldn't know this without checking. The point is I caught the failure before flight and there was no danger to others at the field.

Regarding failures, when my customers would ask for help to figure out why their plane crashed, I would go into my NTSB mode and ask a series of questions. Since batteries are the leading technical cause of crashes I always started with batteries. Were the batteries load tested and checked before flight? The answer was usually no. If the answer was yes I would ask the follow up question - what were the readings and was a load applied? Many times the answer was they didn't know or couldn't remember. **This is important information as the battery trend lines are an important indicator of battery health.** It's also important to know as soon as possible after a crash what

the battery test readings are. It's the first thing to check after the crash. I wouldn't even move the wreckage. If you wait too long batteries can recover masking the cause of the accident. These readings isolate cause and effect to include or exclude batteries as a contributing cause of the crash so we can learn from the failure. Now, let's talk about test procedures.

Load Testing Batteries

The purpose of load testing batteries is to determine if there is sufficient charge in the batteries to safely fly the plane. This is done by applying an electrical load to your battery with a load tester or for lipolys, using the special tester that checks cell voltage and resistance of each cell.

Various meters used to test different battery types

Several manufactures produce digital meters with built in loads for this purpose. I use the HAN 171 Voltmeter with variable load tester shown below. This meter features a .5 amp, 1 amp, and 2 amp selectable load to make it compatible with a variety of battery mah sizes and chemistries. I also use the Fromeco load tester made specifically for lithium batteries. Not all load testers are compatible with all batteries. Using an incompatible tester with your battery chemistry is dangerous and often gives a false safe reading.

A common mistake is to use a straight voltmeter to check voltage without a load *to test a battery. This is a waste of time as explained below. Lipos use a slightly different tester that checks individual cell voltage and resistance.*

Some modelers use too small a load to test the battery which gives a false safe reading *as explained below. The result is a successful take off and a crash midway thru the flight.*

When the load is applied the meter reading will drop. The voltage drop varies with the size and type of battery. The cutoff voltages vary with battery chemistry. Make sure you use the correct tester set to the correct load for the chemistry you are testing and be aware of the cutoff voltage when it is no longer safe to fly the pack.

This photo shows a Fromeco load tester with a 1 amp load being applied to a 5200 mah 4 cell series parallel Lithium-ion pack. This reading indicates the pack is safe to fly. Testing any type of battery takes about 15-30 seconds to perform. Cutoff voltage for this 4 cell series parallel pack with a 1 amp load applied is 7.0 volts. This 40% plane's typical discharge rate is .1 volt per 15 minute flight. If any significant variance from the norm occurs it's a warning that needs to be checked out prior to flying to see why the pack is going down faster than it should.

Li poly Test Meters

For those who fly electrics pre and post flight monitoring is recommended and performed with a meter designed for lipos to check the voltage and resistance status of individual cells. I would recommend using a sharpie, to write on the pack, the date the pack was put into service, the cells voltage and resistance readings as a point of reference to monitor trend lines of the battery. Most modelers take several packs to the field and its impossible to remember each packs readings. The photo represents a few of many lipo battery testers that can be used to check the before and after flight readings. Testing will create a predictable charge and discharge pattern allowing the modeler to watch for problems with the pack.

A few load test examples – Lithium Ion - A 2 cell 2600 mah li-on wired in series or a 4 cell 5200 mah li-on (two 2600 mah 2 cell packs wired in parallel) wired series parallel is considered fully charged at 4.2 V per cell. A lithium cell becomes unstable and shock sensitive above 4.2V so it's important to monitor charging cutoff voltages to insure the charger is not overcharging the pack. (Some popular chargers, set the cutoff peak charge voltage at 4.1v per cell for lipos instead of 4.2 V used for li-ion.) The no fly cutoff is still 3.5 volts per cell.

The industry standard cutoff is 3.5 volts per cell for lithium ion because the discharge curve is very flat down to about 3.5 volts per cell and then drops very rapidly after dropping below 3.5 volts per cell. By the way, that's assuming the cells are in good condition. If one cell in the pack is weaker than the other cells, the discharge curve drops faster at a higher voltage when the pack goes offline.

For other chemistries a fully charged nicad nimh will charge to about 1.3 to 1.4 volts per cell. They are considered dead at 1.1 volts per cell. That means a fully charged 4 cell will charge to about 5.4 to 5.6 volts no load and with a proper load applied it will drop to the low 5.0 – 5.1 volt range. The discharge curve is rather flat until it gets below 4.7-4.8Volts and then like li-on the discharge curve goes almost straight down. A 5 cell nicad/nimh pack will charge to around 6.5-6.7 volts and a strong pack will charge to around 7 volts. If you have a weak cell or cells in any pack it will not charge to rated capacity. You won't know this if you don't load test your batteries. Also, all batteries are generally considered beyond their useful life when the pack capacity falls below 80% of its stated mah.

Some common battery cutoff voltages and loads are:

Ni cad nickel metal are tested with a C/3 load. A 4 cell nicad or nimh are considered dead at 1.1 volts per cell with a load applied. (4.4 volts) and the no fly is 4.7-4.8 volts with a C/3 load applied. A 5 cell is considered dead at a loaded 5.5 Volts with a no fly at 5.8-5.9 V with a proper load applied. The amount of load applied varies with the battery mah. For example you don't test a 4 cell nimh /nicad 3000 mah pack with the same load as a 600 mah 4 cell pack. A large pack tested with a small load will ALWAYS give a false safe reading which is dangerous. ~ Heads Up ~ A 3000 mah 4 cell pack is tested with a C/3 load which means a 1 amp load is applied with a safe cutoff voltage of 4.7- 4.8Volts under load. A 4 cell 600 mah nicad/ nimh is tested at C/3 which means about 200 mah is applied with a safe cutoff loaded voltage of 4.7-4.8 volts. A 5 cell nicad or nimh is also considered dead at 1.1 volts per cell or 5.5 Volts with a load applied with a 5.8-5.9V no fly loaded voltage.

A modeler will soon learn his typical discharge rate for a particular plane and battery by noting the pre fight and the post flight voltages and internal resistance on lipos. In the case of lipos the internal cell resistance and voltage variances will be noted to reveal deteriorating cell performance. When unexpected variances occur stop and check out the problem before flying again.

Why is this testing important?

Let me give a load testing example that happened to my AMA Master's competition plane. This plane was equipped with 600 mah 4 cell nicad pack which typically drops .2V per flight as tested with a 250mah load (C/3 – 250 mah load – Hobbico meter - close enough to C/3) and recovers by .1V after the flight. This discharge pattern is repeated until the battery reaches 4.8-4.9V where it stays for 2 flights and then rapidly drops. This discharge curve is just like clockwork. One day I flew my plane and when load testing after the flight I discovered the loaded voltage dropped from 5.4V before the flight to 4.9V after one flight. Wow! Mucho bad! (3 years of intense Spanish training) I burned ½ volt in 1 flight. Even though the test meter's AOK **green light** was on, it was apparent something was wrong. If I had flown the plane a second flight a $3000.00 plane would have crashed and endangered others due to battery failure because I would have started at 4.9v and burned ½ volt or more to around 4.4 volts or less (dead battery).

With electric planes, when an aberration of your normal discharge lipo curve takes place, including, unexpected changes to the internal cell resistance or voltage it's time to stop flying the pack and check it out.

This original design plane went on to become the US Nationals AMA Masters precision aerobatic first place qualifier however it wouldn't have if I hadn't understood the meaning of the load test data. More importantly no one got hurt with this 125mph 9½ pound aerobatic competition plane. The challenging question is would you have caught this battery problem if it occurred on your plane?

General Comments

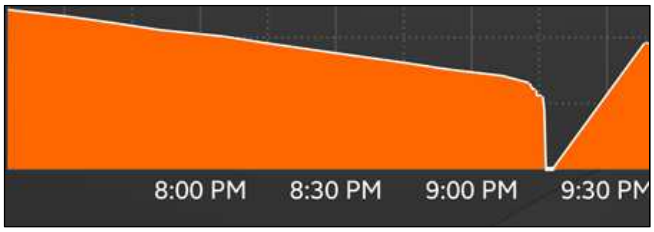
Using too small a load to test is like a mosquito on the back of an elephant. *The elephant doesn't feel it. If the modeler applies too small a load, (for example, a 200 mah load on a 3000 mah pack – that's a C/15 load), the test will give a* false safe reading *telling the modeler that the batteries are safe to fly when they may not be.*

Redundant batteries. It is wise to load test and operate redundant batteries, especially on large aircraft. Smaller aircraft often don't have the space so we run 1 pack ***which makes testing and proper maintenance even more important*** because if the battery fails you don't have a backup.

Check this out ~ 3200 mah Lipo test data performed for this article on 8/10/16

This test was performed on a 3200 mah Li poly pack but the discharge slope, while varying somewhat with battery chemistry, is fairly representative of the discharge curves of healthy lipo, Li-on, nicad, nimh and many other batteries that we use. The graph shows the relatively flat discharge line (voltage) of my lipo battery over a timeline using a battery monitoring program. Notice that voltage goes from normal to dead, almost immediately – "Heads up – Notice this battery gave no warning *when the battery went off line. The line moving up on the right indicates that I connected a charger to the battery. As you can see the voltage line if extended, still had a ways to go before being completely discharged but that's not how batteries typically fail. They go over the cliffs edge and die at various voltages and capacities depending on the health and chemistry of the pack. Healthier packs take longer to die than packs running on weak cells but when they do die and the voltage drops* without warning *like the chart shows. Heads Up!*

This is a check on a good battery. Imagine what an imperfect pack will do. If you have weak cells or defective charger the pack will go offline early further up on the slope. Keep this chart in mind as you read the following accident report and you will clearly see why so many modelers crash when they don't properly check their batteries before flight.



A Tragic Sad Story

An attorney, from a Chicago law firm, called me one day at the store. The lawyer said he made a number of calls around the country including the AMA and people kept referring him to me for technical assistance. He commented that he learned I had a national reputation as the National Transportation Safety Board (NTSB) for model aviation (his words – not mine) and needed my assistance. I thought maybe he crashed his plane and needed my help in figuring out the cause of his crash as I took troubleshooting calls like that almost every day for almost 2 decades.

It turned out that this Chicago law firm was representing a modeler victim. This modeler was enjoying himself at the flying field when he couldn't get out of the way fast enough and was hit by a giant scale airplane flying at full power. The impact literally tore his leg off at the hip and inflicted numerous deep lacerations on his body cutting arteries, and cut internal organs from the carbon fiber prop turning at full power. His entire leg up to his hip was thrown many feet from his body. As he lay unconscious bleeding to death, an air ambulance was summoned. He died at the field but the med evacs arrived and got his heart started again and flew him to a hospital for emergency treatment to reattach his leg and

treat all his other impact injuries. His heart stopped several more times in the helicopter and each time they were able to shock his heart into starting again. A law suit followed.

The law firm hired me as their technical expert to evaluate the 'probable cause' or causes of the crash which quickly became apparent during my investigation. I had all the police reports, photos of the equipment he used in the aircraft, numerous witness and pilot statements to the accident. The pilot said he had flown the plane several times that day and claimed at the time of the crash he had no control over the plane when it hit the victim – like the switch was turned off. (Dead Battery?) hummmm, the most common cause of RC crashes. (The switch tested ok and there was no backup battery).

First of all, my investigation discovered there were numerous dangerous setup issues with his plane that I'll skip and get to the battery. He load tested his lithium battery with an incompatible load tester. After flying the plane all day with a lithium ion battery and no backup he used a Hobbico load tester which has a 250 mah load meant for small nicads and nimh instead of the industry required 1 amp load. I immediately knew he got a false safe reading. Consider the above charts discharge curve and a modeler who got a false safe reading due to using the wrong load tester. Along with other setup issues this was a major contributing factor to the accident.

The victim survived after numerous surgeries. The last time I spoke with the middle age victim he was confined to a wheel chair. Obviously no one planned for this to happen. All this grief, pain and suffering was caused because an incompetent modeler had set up his plane improperly and used improper testing procedures to check his battery. Additionally, non-compliance with multiple JR service bulletins about the dangers of operating incompatible servos with certain receivers, were all contributing causes to this accident. Let's use this accident as a learning tool so it's not repeated.

Those who fly small planes are not immune from danger. A small plane can inflict a lot of injuries as well. Over the years I've seen 3 accidents with small airplanes that caused severe injuries. While no one was injured I saw a .40 size 52" wingspan Ugly stick in Oklahoma City, go completely thru the front windshield of a car in the parking lot at a fly in winding up in the car's front seat due to a dead battery! Think of the kinetic energy that it took to go thru safety glass.

Specialty Customized Packs

For those interested in high quality lithium ion battery packs with custom connectors and custom configurations I've included a photo of the Don's Hobby Shop (DHS***) packs that are very popular.***

These high quality (no factory seconds or blemished cells) Lithium-ion packs that Don's Hobby Shop (800-972-6273) manufactures to the modelers specifications. The latest configurations have up to 10,000 mah or more packs available with high discharge rates and any connector or wiring configuration you want. *See new product review of these DHS batteries in last months issue of* ***Model Aviation*** *and the flight test in September 2016 issue of* ***FLY RC****.*

Summary

So there you have it. I've written for the majority of magazines for over 40 years and my closing sign off for all my articles has always been ~ Fly SAFE ~ That is the proper application of common sense practices and procedures to insure the safe effective operation of your aircraft so we don't create hazards by repeating the mistakes of the past.

This flight tip provides the reader with the knowledge to take the 15-30 seconds to test all types of batteries to check that they are safe to fly. This information will enhance the safe operation of your plane and reduce the possibility that you will lose a plane from the #1 technical cause of RC crashes. It is not a fait accompli that sooner or later all planes crash. That's a modeling cliché' passed on by those who don't know what they don't know.

If a modeler *:*

1. Carefully chooses the correct equipment
2. Sets the equipment up properly
3. Learns to fly with proficiency
4. Regularly checks and maintains the aircraft

…A crash should be the exception rather than the rule. Hummmmm- - - Come to think of it isn't this the safety profile that full scale aircraft practice?

If you fly around people who are not battery smart be alert. To those who don't know share with them the importance of testing and keep your heads up, so you don't become a victim of an avoidable accident.

Let's all walk the walk and keep planes, people and property around you safe.

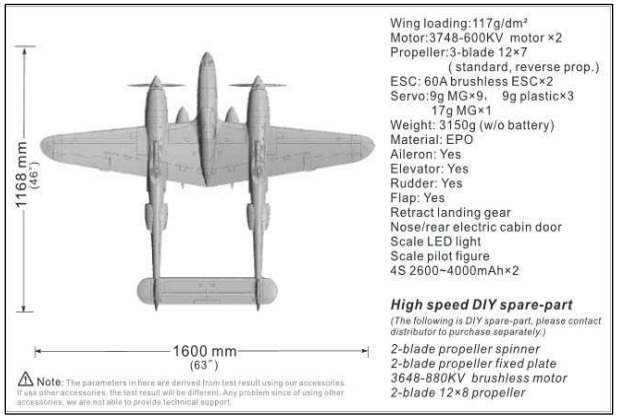
Until next time…

Fly Safe

FlightLineRC P-38L Build and Flight Review By Chuck Pierce

I got back into RC in September 2015, after having dabbled in RC for a year, about 12 years ago. So, I'm far from being an expert in RC piloting and won't pretend to be. My passion in aircraft has always been the WWII European Theater of Operations (ETO) fighters. Within RC, I have been focusing on 1/10 scale warbirds, based primarily on their availability, price, and ability to fit several of them into my Chevy Tahoe. Several months ago, FlightLineRC (a company under the MotionRC Domain) released a 1/10 scale P-38L PNP kit with all the bells and whistles. I'd been coveting this plane for quite a while, and finally popped on it. The purpose of this review is to highlight some of the features of the kit, discuss my perceptions while assembling the plane, and provide some details on my maiden flight of this wonderful kit.

The FLRC P38L is sold as a Plug-n-Play (PNP) kit, meaning that everything is provided (and mostly installed), except for the receiver and the battery. The cost of the kit is sold through the MotionRC website for $345. The P-38 is marketed in pre-painted silver or OD Green, and each color scheme contains trim packages to model 4 different specific aircraft. The trim packages are a mix of vinyl and water-slide decals. To be truly historically accurate, some painting would be required to accurately model the aircraft represented by some of the trim packages.



FLRC PNP P-38L Specifications

Some key features of the kit are as follows:

- Scale profile, accurate wing dihedral, and precisely modeled overall aircraft proportions
- Removable outer wings for easy transport
- Scale three-blade counter-rotating propellers
- Capable of achieving 81 mph and vertical climbing capability
- Four different decal sets included inside the box for you to choose from
- Day-bright LEDs
- Large cabin space for easy placement of the battery and radio equipment
- Improved spinner and propeller mounting design to enable better balance
- Durable Electric retractable landing gear with metal trunions and 4mm steel wire struts
- Sequenced plastic gear doors for realistic operation
- Tall foam rubber wheels for optimal handling on paved surfaces and short, evenly cut grass fields

Approximately 13 servos are included, along with a control module that allows for controlling all of these servos with only a 6-channel radio.

Shipping and Receiving

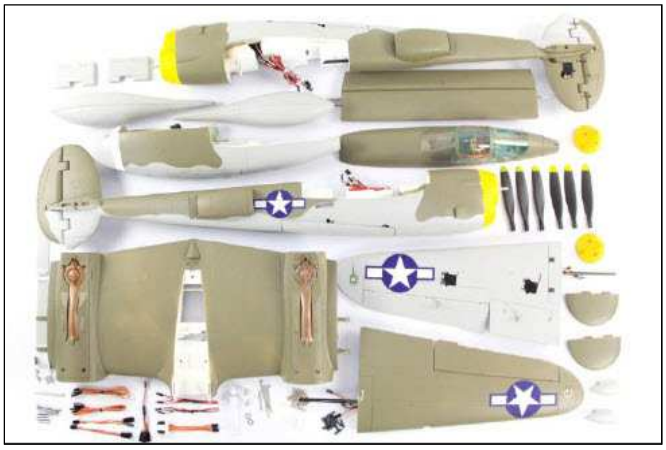
I ordered this kit direct from the MotionRC Website. The transaction was easy, and the shipping was free (for orders over $100). The P-38 box was packed and well protected within a heavy duty shipping box. The

components were well packed within stacked Styrofoam trays. I'd ordered a few extra parts (including 4S-5000 mah battery and a set of counter-rotating props); these parts were packed and secured within the P-38 kit box. No damage was noted to any components.

Assembly

Assembly was really quite easy. The instructions estimate 3-4 hours for assembly, and that seems pretty accurate, for the first build. I took longer, because I proceeded very cautiously. However, if I had it to do over again, I'm sure that I could assemble the kit easily within an hour. Except for 5 servo and LED extension cables and the integrated control module, all electronics were pre-installed. The servos all seemed robust, but to be on the safe side, I jury-rigged a servo tester, using a spare RX, BEC, battery, and a spare channel in my Spektrum DX6 transmitter, and tested each servo prior to assembly of the aircraft.

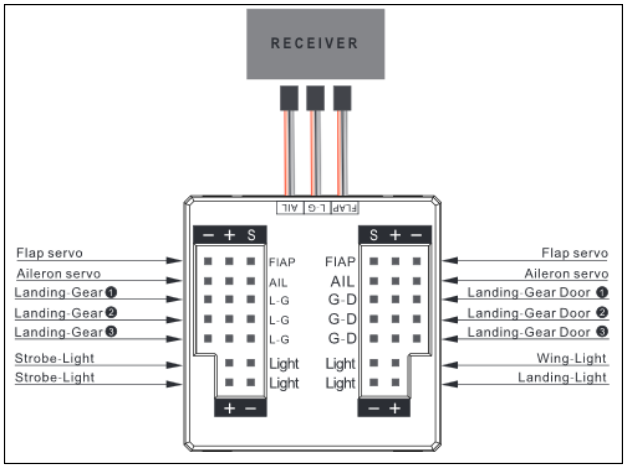
The instructions are functional, but not really very useful in sequencing the assembly steps. They leave out some extremely critical steps, which ended up causing me some severe angst when I had to disassemble a partially-assembled airframe to run a couple more cables. The Chinese-English of the instructions is not too bad, but not great either. The instructions do a horrible job of identifying the included fasteners and describing how they're to be used. I had to sort the fasteners and push rods into piles of similar items, then read through the instructions to figure out where each was to go, and then label the fasteners as such. I did end up being short one push rod, but I'm not sure if the push rod had been omitted from the package, or if I had misplaced it. It was easy enough to make a replacement push rod; so, I didn't contact MotionRC about getting a replacement. To counter the poor assembly manual, MotionRC has made several construction videos and posted them to YouTube. Here is a link to their compressive build guide: https://youtu.be/cvD9NtHZ7S4.



The major components consisted of the Center Fuselage, two Center Wings, two Booms (which each include a Vertical Stabilizer), two Outer Wing Sections, Horizontal Stabilizer (between the booms), and two outer Horizontal Stabilizers. Assembly of the major components was very intuitive and easy. The only mistake that I made (even after watching the Assembly YouTube video several times) was that the I failed to run the aileron and outer flaps servo extension and three LED cable extensions from the outer wing, through the Boom, Center Wing, Center Fuselage, and into the Electronics Bay. This mistake meant that I had to unscrew both Booms from the Center Wings and the Center Wings from the Center Fuselage. Then, after running these extensions and reassembling the major sections, I realized that the left wing had a landing light LED and a wing tip LED, but I'd only run one LED extension cable; so, I'm flying without the left wing tip LED because I refused to disassembly the P-38 again, just for an LED which is only for looks.

Servo Cable Bundle

Nearing Completion



Integrated Circuit Module (ICM)

Throws, Mixing, and System Checkout

As Don has suggested several times, prior to connecting the push rods, I increased the throws within my DX6 transmitter from 100 to 150, and made sure that none of the control surfaces or servos were over extended. I then connected the push rods. In most cases, I left the mechanical throws at their maximum, except for the elevator, which I moved in one hole on the servo arm. The P-38 has split flaps, both on the center wing section and on the outer wings. I set full flaps to approximately 60° and half flaps to approximate 30°. The manual recommended mixing in 1.5 mm of down elevator for half flaps and 3 mm down for full flaps. I didn't do this prior to my maiden flight and had no serious problems with pitching at half flaps. I never deployed full flaps during the flight. The instructions also recommend 4mm of up elevator for neutral, which I didn't do prior to the maiden (a sin of omission because I missed that recommendation until I reread this section of the manual 5 minutes ago).

One of the really neat features of this kit is their use of the Integrated Circuit Module (ICM). The throttle and rudder servos plug directly into the RX, but all other servos go through the ICM. As you can see in the figure, each gear and gear door servo plugs into the ICM, and the ICM does a nice job of sequencing the doors opening and closing, in relation to the gear deployment and retraction. The gear deployment and retraction worked without a hitch. I only had one problem with the ICM. The aileron circuitry within the ICM had a flaky wire or connection. Every time I flexed the servo cable bundle, the ailerons would twitch and sometimes quit working. Luckily, the ICM isn't absolutely required for the ailerons. I connected the aileron servo wires with a Y extension, and ran the extension directly into the aileron channel on the RX. Aileron problem solved.

The dual props each come with 3 separate blades. I screwed the props together and balanced them. On each of the props, one blade was significantly heavier than the others, and I had to rigorously sand the heavy blades. During the course of this sanding, I suffered my only injuries of the entire assembly and checkout process –massive burn blisters on my right-hand pointer and index fingers. 220 grit did not cut the mustard. I will use 60 grit next time, then fine sand when I get close to the proper weight.

I chose to use a Spektrum 6-channel AR610 Receiver, which I had previously used in an airplane which is currently in the repair shop. I have known this receiver to be very reliable, and I trusted it in my prized P-38. Even so, I took the assembled the P-38 into my yard and did a rigorous distance check, with the help of my wife. The P-38 has dual ESCs to drive the motors. The standard setup seems to be to use dual 4S-2200 mah batteries, but since I had no 4S batteries already, I chose to use a single 4S-5000mah 60C Admiral battery from MotionRC, and had to make an EC5 to dual Deans adapter to power the dual ESCs.

The Big Payoff - Maiden Flight

The weather broke on Sunday, 18 September, and after receiving an email from El Jefe Rick, saying that he'd be at the field around 1 pm, I quickly recharged the 5K battery, and headed to the field with my daughter Bethany. The CG was at the cable run, which was close to the recommended 2-9/16" from the LE. I was running full rates with 30% expo on all of the control surfaces. Winds were less than 5 mph, right down the centerline, from the North. I had not set any mixes on the flaps; so, I'd decided not to deploy flaps during the maiden. I checked all control surfaces, and everything was good. Several club members made recommendations for tweaking the control surfaces to neutral, and I did this with the transmitter. Rick stood with me for the maiden.

Before the flight, I made a takeoff roll test, and the P-38 accelerated well and ran true. I chopped throttle and taxied back to the southern end of Epps Field.

The takeoff roll was great. Got up to speed and added a little back pressure, and the wheels eased off the ground. Immediately, though, the plane banked hard to the right, toward the trees lining the East side of the runway. I kicked in full throttle, up elevator, and left aileron, and banked away from the trees. I gained altitude, made an S turn to put me into a left-hand pattern (because I hate flying right-hand patterns), and pulled around for some trim runs down the runway. The plane was pulling hard down and to the right. It was pulling so hard that I didn't want to release the stick to add trim; so, I asked Rick to click in some up and left trim for me. It took about 4 passes to finally get the P-38 dialed in. During the flight, I had to be careful to keep the plane as close as I could. It has such a slender aspect ratio, that it's easy to lose the orientation of it. I almost lost it during the very first S turn.

This is my biggest plane, to date, at 63" wingspan and 8.5 lbs, and a BIG step-up from my 3S 1100mm warbirds (all tail-draggers, which reminds me that Rick kept having to remind me not to use back pressure during taxi and take-off). This plane also requires much more speed than my others; so, I got several friendly reminders from Rick to keep my speed up. I always get nervous on maidens; but I was incredibly nervous during this flight. My heart was pounding out of my chest. I was controlling the plane just fine; I just couldn't settle my heart rate down. When 5 minutes had elapsed, Rick offered to land the P-47, and I let him. My nerves were too shot to make an approach pass or two, and then land. So, I handed my radio to Rick l, and he landed it easily. He used no flaps, flew 1/2 to 3/4 throttle to a few feet off the deck, chopped power, and it settled down.

After recharging the battery, I put her up again. My nerves were under control this time. Tested half flaps (no mix), and got a little nose-up, but it was easily controllable with a touch of forward pressure. I retracted flaps and made a high speed pass into a victory roll, then an Immelmann. The Immelmann wasn't crisp, but that was my fault, not the planes. The P-38 has plenty of power. I was cruising around ¾ throttle, but when I kicked in WOT the P-38 climbed and rolled very well. The controls were very responsive (full rates), but the 30% expo sufficiently softened the throws. I was much better on this second flight at keeping my speed up. She felt really good! I dropped gear and half flaps, banked onto final at half-throttle, and descended to a few feet off the ground. I could have landed it, but I decided to go around again. Half flaps still, into virtually no wind. I came in a bit too high; so, I cut power and nosed down a tad. As I neared the ground, I applied a little more throttle to retard the descent, then floated in for a nice landing. No walk of shame… this time!

Post Flight Research and Analysis

When I had posted my maiden flight report on the FLRC P-38 RCGroups Forum, several folks responded that there had been reports of one wing drooping a bit, in relation to the other, causing a dramatic pull to the right at take-off. I have been unable to notice a difference between the wings visually. So, I don't think my plane has this problem. As I noted in the Setup Section above, the manual recommended 4mm of up elevator for neutral. Not having done this prior to my maiden flight accounts for the plane wanting to dive during the flight. There have been some concerns expressed by owners of this plane that bad solder joints have been found in the ESCs, and quite a few complain about the FLRC-proprietary 3-piece props. I have decided that the slender aspect ratio of this P-38 warrants the addition of invasion stripes. I personally think that invasion stripes detract from the beauty of warbirds, but in this case, I think I need them to help me see the orientation of the plane while I fly it.

Summary and Conclusion

I love this plane! It is a highly accurate 1/10 scale model. The components are high quality. I love how it handles. It feels 'scale', but seems to have plenty of power of power for reasonable climbing maneuvers. The controls are very responsive, and 30% expo feels like a great dampener, without causing any other control issues. After having flown the P-38 twice, I'm still concerned about the slender aspect ratio of the plane, and plan to paint invasion stripes onto the plane. This was my first 4S plane; so, having to also purchase an $80 4S-5000 battery was a bit painful. You have to pay to play, I guess. The PNP kit does cost $350, but if you consider the quantity and quality of the components included, I don't think that anyone could buy the components individually to assemble this plane for less than the price of the kit. The FLRC P-38L is an outstanding PNP kit! I consider it a great value and am really happy to own it and to be able to fly it.

Chuck Pierce