

TRI-COUNTY

WINGSNAPPERS



THE CONTROL TOWER NEWSLETTER

AMA 573, IMAA 138

www.tcws.org

April 2006

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REMINDER - The April meeting has been moved to April 23rd due to Easter falling on the 16th. Meeting will be held at the TCWS field!

NEXT MEMBER MEETING:

**SUNDAY, 23 APRIL 2006 @ 1:30 PM
TCWS CLUB FIELD**

DIRECTIONS TO MOOSE LODGE:

Hamburg Exit from Route 22
2nd Floor, 12 South 3rd Street, Hamburg, PA

OFFICIAL FIELD LOCATION ADDRESS:

Tri-County Wingsnappers, Inc.
329 Balthaser Road
Lenhartsville, PA 19534

Tri-County Wingsnappers, Inc.
c/o David Kilmer
8-6 Heather Hts.
Reading, PA 19606

President's Message...

Our 13th annual swap meet was a success again this year! Thanks to all of you who helped out!

*Please take note that the **April meeting date has been moved to April 23rd**, as the regularly scheduled date (3rd Sunday of the month) falls on Easter Sunday this year! Because of this, the bulk fuel sale deadline for orders/payments has been pushed out to April 17th, (all orders and payments must be given to Terry Miller by then), and distribution will be at the April 23rd meeting. I will also call for a vote on the dues increase at this meeting.*

Best Regards,

Paul Hartley

Editor's Two Cents

Thanks for the positive feedback from last month's newsletter! In our continuing effort to keep things interesting, this month we have another review by Paul, and a story of heartache, dedication, redemption, and more heartache....all for your amusement of course!

I also want to encourage you to let me know if there's a topic you'd like to see covered in future newsletters. You don't have to write the article (unless you want to!), so don't be shy! Paul has a lot of other responsibility on his shoulders as club president, and I'd hate to add to his workload any more than we have to! I'm even considering a "Letters to the Editor" column, so feel free to email your comments, criticisms, and even general observations. Keep it clean, and we can have some fun with this! Hope everyone had fun at the swap meet! Until next month...

David Kilmer

Club Secretary

iflyslow2002@yahoo.com

Unofficial Meeting Minutes...19 March

President Paul Hartley called the meeting to order at 1:35pm at the Hamburg Moose Lodge. (20) members were present.

The 50-50 drawing was won by George Case who generously donated his winnings back to the club. The club netted \$31.00. Thanks George!

David Kilmer read the minutes from the February meeting, and no additions or corrections were made. Motion was made to approve by Bud Wunder, seconded by Walt Gladney, and approved unanimously.

Treasurer's Report: Dale Loop read the treasurer's report as of 19 March. Jim Pauley moved to accept, Eric Rudjord seconded, and the club voted unanimously to accept Dale's report.

OLD BUSINESS

Field Care: George Case reported that the fuel tank on the tractor has a leak and is being fixed with Dennis Christman's kind assistance.

Union Fire Company Lawsuit: No news since last report.

2006 Events: Dave Renninger reported that 82% of the tables for this year's swap meet have been sold, and he expects the rest will sell by the day of the show. Dave also reported that Iron Horse Hobby has donated a Katana, and that the Allentown Hobby Town USA may also donate items to be raffled at the event. Setup will begin at 12 noon on Friday, March 24th, and all volunteers are welcome. Some jobs don't require physical strain, so anyone who can help in any capacity is encouraged to be there or be square!

Giant Scale Fly-In: Dale Loop reported that both the AMA and IMAA sanctions have been received. The event is planned for June 17th and 18th. Signs will need to be placed at appropriate intersections as in years past to direct traffic to the club field. Additionally, the club's web site offers detailed directions to the field.

The 2006 Pig Roast, Fun Fly & Fundraiser: Dale Loop reported that flyers have been made, and that sign-up forms will be posted at the field in June.

New Shed: Paul Hartley reported that the proceeds from the DaVinci Discovery Center event (discussed at last month's meeting), will be applied to the building fund for the proposed new shed. Once we have some funds built up for Flying Site Development, we'll apply for the AMA grant in the next cycle (2007). As discussed last month, we are actively soliciting donations from club members toward the building fund. Please note that if you make such a contribution, you MUST clearly designate the donation towards this purpose!

Bulk Fuel Sale: Terry Miller advised the club that he's still taking orders for our annual bulk fuel sale. Due to the revised schedule for the April meeting, the time available to place your order has been extended. Please have your order (and your money!) to Terry NO LATER THAN April 17th. The fuel will be distributed at the next meeting (April 23rd), so remember to bring your containers!

Leader Club Status: Paul Hartley reported that he's begun to fill out the paperwork to achieve Leader Club status with the AMA. Paul created an "Intro to RC Aircraft" flyer, which meets one of the goals required for Leader Club recognition.

Intro Pilot Program: Two more pilots have signed up to be Intro Pilots. Thanks to Dale Loop and Jim Ellis for volunteering! Dale and Jim will join Jack Hilbert, John Messersmith, Dave Renninger, Lee Buskirk, Eric Rudjord, and

Paul Hartley as the club's designated Intro Pilots. If you'd like to volunteer to become an Intro Pilot too, email Paul.

Increasing Club Dues: Paul Hartley again proposed that beginning with 2007 memberships, dues should be raised to \$65 for individuals (from the current \$50), and \$100 for families (from the current \$75). Initiation/late fee will remain at \$25 under this proposal. This is the second meeting at which this suggestion has been proposed. As discussed last month, the issue will be raised one more time at the April meeting, and then submitted to the club for a vote.

New TCWS Event – Memorial Day Display and Flight Demo at DDC (DaVinci Discovery Center): Paul passed out sign up sheets for planes, park flyer demo pilots, and volunteers to work the display. The event is scheduled for May 26th and 27th (the Friday and Saturday of Memorial Day weekend). If you can loan a plane to the display, or participate in any other way in this event, please sign up or email Paul Hartley.

BCTV Videos: Bud Wunder has sent out copies of the show to several people around the country. One copy of the program remained as of the meeting and Bud offered it to anyone who hadn't seen the show yet.

NEW BUSINESS

Getting Started Brochure: Paul passed out copies of the "Getting Started brochure he recently created. This flyer is currently being distributed at the Allentown Hobbytown. The brochure serves to both introduce people to the hobby, and also to promote the club and advertise our events. If you know of a hobby shop that would be interested in helping us promote the club and its activities in this manner, Paul can customize a brochure for that purpose, so just ask.

JR Trainer Box & Cable: Paul Hartley proposed that the club purchase a JR-specific trainer box and cable to allow instructor pilots to provide training to members who use JR equipment.

New Fundraiser Proposal: Paul Hartley suggested an annual fundraising event where club members can bid to have their own personal club bench for a year which would be reserved for their use. After some discussion, the idea was abandoned to avoid potential conflicts between members.

New Lifetime Member! Eric Rudjord made a motion that the club honor George Case with Lifetime Membership as a thank you for all the hard work he has always done for the club. Terry Miller seconded the motion and the motion was passed by unanimous vote of all present.

ANNOUNCEMENTS: Next meeting will be Sunday, April 23rd at the TCWS field.

Motion was made by Dave Renninger to adjourn the meeting @ 3pm. Eric Rudjord seconded, and all present voted to close the meeting.

UPCOMING R/C EVENTS

April 23rd: TCWS bulk fuel sale distribution. Orders and payment due to Terry Miller by April 17th.

May 26th & 27th: TCWS RC plane & heli display and demo at Da Vinci Discovery Center in Allentown.

June 17th & 18th: TCWS Annual Giant Scale Fun Fly.

AMA/IMAA rules for size apply for flying on Saturday. Open flying (any size aircraft) on Friday and Sunday.

August 6th: TCWS Pig Roast and Fun Fly to follow. Free to TCWS members and family. Public is welcome, but will be charged \$5 each. Sign-up sheets will be at the field to RSVP and to volunteer to bring food.

Electric Power Systems for RC Aircraft

By Paul Hartley

From what I've seen at our field, most of our TCWS members primarily fly nitro and gasoline powered aircraft. Recently, however, electric power systems seem to be catching on in our hobby, and a growing number of new and established members are starting to get into the small electric park flyers or "foamies". We even have one member (Dan McCoach) who is actually flying larger planes (.40 -.60+ sized) with brushless motors. With this growing interest in electric power systems, I thought it would be interesting to go over some of the different types of electric power systems available, and cover some generally accepted guidelines for choosing an electric power system for your aircraft.

Electric vs. Nitro Power Systems

Electric power systems are clean, quiet, and don't require you to keep buying and feeding them fuel. Most electric power systems require little or no maintenance, and can typically be flown for a couple hundred flights before having to replace the battery packs. With brushed motor systems and NiCd/NiMH (Nickel-Cadmium and Nickel Metal Hydride) battery packs, the power to weight ratio suffers greatly compared to nitro power systems, but the brushless motor and LiPo (Lithium Polymer) battery powered systems can give the nitros a run for their money. For the tiny park flyer and "foamy" planes, electric power systems are relatively inexpensive, reliable, and simple to use. For the larger planes, the high power requirements drives the cost of the motor, ESC (electronic speed controller), and battery up rather quickly. As a result, the up front costs to equip a large plane with a good electric power system starts to get rather high... and for many of us, nitro is still looking pretty good from the cost perspective... as long as we don't mind the noise or the "slime" cleanup! However, as brushless/LiPo system costs continue to come down, this will become a more and more tempting option for many!

Brushed vs. Brushless Power Systems

Let's take a brief look at the differences between brushed and brushless power systems. In a very simplified view, brushed motors have a built in mechanical switching

mechanism, comprised of the brushes and the commutator (or “com”), that switches the electrical current to cause the rotor to rotate. This internal “switch” makes the design of the ESC (electronic speed controller) quite simple, the controller effectively has to provide just a constant DC voltage across the motor’s terminal to run the motor. The larger the DC voltage, the faster the motor rotates. This is the least expensive type of electric power system due to its simplicity. However, there are two primary disadvantages with this system: inefficiency and maintenance. Brushed motors are only on the order of 30%-40% efficient, and the brushes can wear out and need to be replaced.

Alternatively, brushless motors do not have any type of internal mechanical switching device to switch the current and cause the rotor to rotate. Instead, they have 3 power leads, and they rely on the ESC to do the current switching for them. This keeps the mechanical complexity, and the frictional and electrical losses to a minimum, which allows brushless motors to achieve efficiencies on the order of 80%-90%, or about twice the efficiency of brushed motors. This means that, for a given battery pack, just switching from a brushed motor to a brushless motor can buy you up to twice the power or twice the runtime! Since they do not contain brushes, the only mechanical wear is in the motor bearings, so brushless motors are virtually maintenance free. However, the complexity saved in the motor’s design must now be pushed into the brushless motor’s ESC. The ESC must now be able to sense the rotor’s position and switch the motor’s current accordingly to keep the motor running. The brushless motors used for RC planes and helis are “sensorless” motors, which means they do not contain sensors to detect the rotor position. Instead, the ESC must sense the rotor position through the power leads! Needless to say, all this complexity pushes the cost of a brushless ESC up quite a bit compared to a brushed ESC.

NiMH/NiCd vs. LiPo Battery Packs

LiPo batteries have a much higher energy density than NiMH and NiCd battery types. This means that for a given weight, LiPo batteries will have much more capacity, giving you more power and/or longer runtimes. Alternatively, for a given battery capacity, LiPo batteries will be much lighter, which can greatly reduce the weight of an aircraft and improve its performance.

LiPo batteries have gotten some bad press due to accidents that have occurred from improper charging and discharging. However, if you get the proper type of battery charger, and you’re careful to ensure you don’t exceed the battery’s charge and discharge current limits, you are unlikely to encounter any of the horror stories told of exploding packs, or batteries catching fire. If a LiPo pack has its charge or discharge current exceeded, it can start to overheat, swell up due to expanding gasses inside the pack, and “explode” or catch fire. Two pieces of equipment that will help ensure that you don’t have these problems with your LiPo packs are a good quality charger that is designed to charge LiPo cells properly (such as

the **Triton** or **Polycharge** chargers shown below), and a good



current meter or ammeter (like the **Watt’s Up** meter shown below), which is used to check the charge and discharge current levels, ensuring that your charger and your plane’s power system never exceed the max current limits of your battery pack.



Exceeding your battery pack’s minimum or maximum voltage can also damage your pack. Because of this, in addition to the using the proper battery charger, it’s also important to get an ESC with the proper cutoff voltage, to ensure you don’t run your pack down below the min voltage.

Lithium Polymer Battery Chargers

A charger that is designed to charge LiPo cells uses a much different charging method than a charger designed only for NiCd or NiMH cells. Most high quality NiCd and NiMH chargers are “peak” chargers. This means that they charge the cells by applying a specified current, and periodically monitor the pack’s voltage. When the NiCd/NiMH pack is at full capacity, the voltage will peak and begin to decrease with further charging. A good peak charger will sense this voltage peak, and shut the charge current off after the voltage peaks out and then reduces by only a few millivolts.

A LiPo charger uses a CC/CV, or constant current/constant voltage charge algorithm. This means that the charger will apply the specified charge current until the LiPo pack reaches its maximum allowable voltage. Then, the charger reduces that charge current and continues to “top off” the battery pack while not exceeding the pack’s max voltage. A high-end LiPo compatible charger, like the Great Planes Triton charger, will actually display the pack’s voltage and charge current while you charge, and you will be able to see the voltage and current change as the pack charges.

It is very important to note that if you make a mistake and use the NiCd/NiMH peak charging method for a LiPo battery pack, you will most likely overcharge the pack and destroy it!

Brushless Motors: Outrunners vs. Inrunners

There are two general types of brushless motors, outrunner motors and the standard or inrunner type of motor. The standard inrunner motor looks very similar to brushed motors... they have a metal can that forms the stator, or stationary part of the motor, and they have a rotor inside the can (connected to the shaft) that is the rotating part of the motor. These brushless inrunners can be mounted just like brushed motors. In fact, you can often find “drop-in” inrunner

motor replacements for a brushed motor, with the same form factor and mounting hole spacing, to make upgrading from brushed to brushless very simple (you still must upgrade to a brushless ESC).

Outrunners are quite different from inrunners, and they look much different than the standard brushed motors. The rotor for an outrunner is actually made up of a portion of the outer case or “can”, which is attached to the shaft that runs through the center of the motor. This portion of the motor’s case actually rotates with the shaft! Mounting an outrunner can be quite different from mounting an inrunner. You can typically mount an outrunner facing in either direction: You can have the shaft protrude from the static portion of the motor’s casing (photo on right, below) and mount it behind the aircraft’s firewall, or you can have the shaft protrude from the rotating portion of the casing (photo on left, below) and mount it on the front of the aircraft’s firewall.



Alternatively, many small electric aircraft utilize a motor/gearbox unit with a stick mount, and these aircraft can be easily upgraded to a brushless outrunner motor mounted using the appropriate stick mounting bracket (see the photo below).



These multiple mounting options make it quite easy to install an outrunner on virtually any type of aircraft, whether it’s a nitro to electric conversion, or a brushed to brushless conversion project.

In general, outrunners produce more torque and spin lower RPMs than inrunners, and can therefore spin much larger props without a gearbox. Except for very small props, like those used for small pylon racers or prop driven foam “jets”, an inrunner motor will usually require a gearbox to drive an effective/efficient prop for your plane. So if you want the ultimate in quiet, maintenance-free RC flying... an outrunner is your best choice, since eliminating the need for a gearbox reduces noise and improves reliability and efficiency.

Choosing an Electric Power System for your Aircraft

The first decision to be made is whether you want to go brushed or brushless. From what I’ve seen & read, brushed motors typically provide “satisfactory” performance in only very lightweight aircraft... say 16 oz or less. If you’re going to start with a small 8-16 oz park flyer or foam plane, you **may** be satisfied with an inexpensive brushed motor system. However, you will **certainly** be happy with a properly chosen brushless/LiPo motor system with any aircraft! If any of you

have seen Dan McCoach fly his electric aircraft (large and small) at our club field, you’ll have no doubts about brushless/LiPo power system performance! He easily hovers and performs 3D flight with his large electric aircraft (.40 - .60+ sized), and his little brushless powered “Speed 400” pylon racer easily goes over 100mph!

The larger/heavier aircraft with brushed power systems that I’ve seen reviewed can be quite marginal. I even tried my hand at building a brushed electric SPAD (a plane made of PVC and corrugated plastic) a year or so ago, with a brushed 540 motor, gearbox, and NiMH cells... I could barely keep the thing in the air, thrust to weight ratio was terrible!

Just about every electric aircraft review I’ve read goes something like this: First the author builds and flies an electric aircraft with the “stock” brushed motor setup, gets “ho-hum” or marginal performance, short runtimes, and has to run and/or throw it very hard to hand launch it. Next, the author upgrades the aircraft to a brushless motor and LiPo battery system, get’s great performance, good runtimes and has no problems hand launching it with a light toss.

The next decision to be made is what motor size/type to get for your aircraft, and determine the appropriate prop size/pitch. In my opinion, if the aircraft manufacturer doesn’t have a recommended electric setup, the best starting point for choosing an electric power system for your aircraft is to look at what others have used successfully in the same or similar size/weight aircraft. You can also use some “rules of thumb” for power to weight ratio for the aircraft. These guidelines will help ensure that you have enough power for the performance you want from your aircraft. In addition to the power to weight ratio, you also need to look at some of the other motor parameters to be sure that you can use an appropriate prop size/pitch for your model, determine the appropriate number of cells for your battery pack, determine the ESC voltage/current requirements, and determine the battery charger’s voltage/current requirements to charge your battery pack.

A good line of motors to look at first is the Himax line of motors from Maxx Products (<http://www.maxxprod.com>). These motors are typically less expensive than other brands of motors, and they usually come with accessories that are only sold separately by other motor manufacturers (such as mounting hardware, ESC connectors, a prop mounts, etc.). The other thing that makes Himax a good brand to start with is the detailed information you can find in their motor data sheets. They typically show you recommended plane weights, prop sizes, and current draws for each motor! With the info found in the data sheets for the Himax motors, you can then find other brands of motors with similar parameters that should give you similar performance. When comparing motors, you should especially take note of the following motor specs: Kv (RPMs/volt), max power (Watts), max current (Amps), & max RPMs. If you find two motors with similar values for these specs, then the two motors should also be similar in performance with a given prop size/pitch.

If you look at a few Himax motor data sheets, you’ll find the following recommended motor power to weight ratios (in Watts/ounce) for different types of flying: For 3D flying and/or good vertical performance - more than 8.33

Watts/ounce; for aerobatic flying - more than 6.25 Watts/ounce; and for "leisure" flying - more than 5 Watts/ounce.

Well, that about sums up my knowledge on the subject, I hope it helps some of you that are interested in getting into electric flight. I'm far from an expert on the topic... I'm a Microelectronics Engineer by trade, and I have designed, built & flown a few 16 ounce foam & park flyer planes with brushless outrunners and LiPo packs. My only experience with larger electrics is my failed electric SPAD project with the brushed motor! If you have an interest in the bigger electrics, I highly recommend cornering Dan McCoach at our field the next time you see him, and pick his brain for info (hope you don't mind, Dan)!

Crash Recovery

By David Kilmer

Sunday Afternoon (Prelude)

The flying season was almost over by the time I finally got my recently-repaired World Models Sky Raider Mach II (needs a shorter name) up to the club field, and I was anxious to fly her. My first flight was uneventful, and it was a relief to have my plane back in action. Second time up, and it was another smooth flight, the engine was running sweetly, and I was feeling mighty proud of myself. Well, we all know that pride goeth before a fall, right? After about 10 minutes of loops, rolls, and spins, I called "Coming in!" from the downwind. It was exactly at that moment that disaster struck. My heart sank as I heard the engine go silent and the plane's speed dropped. "Deadstick!" I yelled.

Yadda yadda yadda...my plane ended up in the top of a tree.

Initial Attempts

"Yup," we all determine, after trudging across the field to the accident site, "She's up there but good." But this couldn't be a climbable tree. Nooooo. No branches closer than 10 feet up. I bravely tried to climb anyway, since as a kid I could climb anything. Ummmm...no. I'm 40-something now and I weigh about 100 pounds more than I did in my misspent youth, and sadly, not enough of that extra weight is muscle!

After some quiet consultation, it's decided that our recon team must be re-designated as a Retrieval Team. This plane will be saved! Our equipment consists of a compound bow with an arrow (minus anything pointy) tied to some fishing line. The other end of the line is attached to a half-a-fishing-rod and reel.

At first the task seemed simple. Shoot the arrow up through the branches, loop the line over the plane, and tug until it breaks free and crashes to the ground (doubtless causing infinitely more damage than the actual crash itself).

Well, it was a good idea anyway. We tried and tried. Terry is a good shot, but we just couldn't position the line so as to effect sufficient movement to dislodge the plane. Lost an arrow up there too.

With daylight beginning to fade, and any hope of getting in a few more flights fading just as quickly, we finally decided there was no sense in trying to be gentle. So we put a tip on the arrow and Terry started shooting with murder in his heart...or at least that's how it felt to the guy who was about to watch all that Monokote work go down the drain! At first I couldn't watch...but after the first few shots, I was ready to concede the loss of the plane for the sake of retrieving the radio gear, servos and assorted other bits.

Terry, to his credit, managed to bury the arrow in the wing root, not once, but twice, each time seemingly unwedging my baby a little more from the evil clutches of the unfeeling tree. But each time, the arrow dislodged, sending us back to square one. When that didn't work, we decided to shoot through the wing further outboard (where there was no sheeting under the covering), thinking we'd be able to get more leverage if we could trap the arrow on the far side of the wing and....YANK!

Well, all we managed to do was wedge her in better in the end, so....there she sat. Forlorn, hopeless, far more damaged than she was when we started, and still containing all my precious gear....including a locator beeper that continued to forlornly announce my abandonment as we all packed up and drove home for the night.

MONDAY MORNING

The Scene: Pre-dawn....the world's still asleep when my alarm goes off. Today's SAR mission is about to start. I stumble across the darkened room, and bleary-eyed, listen to the sound of the rain outside....."OK," I mumble to myself...."just 5 more minutes." Half an hour later, I force myself out of bed for the last time. This mission is important....it must be completed for the good of the hobby! (coffee....I need coffee....)

8am: SAR Team One sets out for the local r/c field....which isn't so local. His rescue equipment consists of two recently-acquired 10 foot lengths of PVC pipe and a coupler to join them. The label reads: "Airplane Retrieval System, Mark One, Mod 0 (we'll call it the "ARS" for simplicity's sake).

8:45am: Arrive at the field, after battling rush hour traffic that could have been avoided if SAR Team One had stayed awake the first time he got up. Don boots for muddy trek to hapless plane. Don insulated coveralls to protect work clothes from near-certain fall on wet leaves and muddy slope. Assemble ARS. Realize too late that pole is going to be difficult to lift with all this wobbling.

8:43am: Extend assembled Airplane Retrieval System to maximum reach, only to discover it is too short. Curse. Repeatedly.

8:53am: Disgustedly trek through the mud to the car.
Disassemble Airplane Retrieval System.

8:55: Deposit Airplane Retrieval System in clubhouse for future use....depart field for work.

9:25am: Arrive at work and begin "strategy" for Plan C.

After Action Report, Wednesday Morning

6am: Up and at 'em boys! SAR Team One is back on the case. With new equipment and incurable optimism....SAR Team One hits the snooze alarm. Twice.

6:12am: SAR Team One remembers is jarred awake by a dream flashback of his ex-wife using an ice scraper to remove snow from the hood of his beloved Audi (hey....I LOVED that car!), and deciding that anything's better than losing the respect of his peers, grumpily arises and begins to dress. Where SAR Team One is going, showers are not an issue.

6:30am: SAR Team One musters to go over P.O.D. (Plan Of the Day). Checklist complete, and with a belly full of coffee, He checks outside one last time. The weather remains dank, gray, and dreary in the burgeoning dawn, but he is committed now....or should be committed.

7am: Realizing he's dragging his feet to avoid the inevitable, SAR Team One proceeds to the Vehicle Extraction....ummmm....Vehicle (VEV). A light drizzle greets him as he locks the barracks door behind him. Cursing his fate, SAR Team One strikes out on Mission #2...the quest to save an airplane.

8am: SAR Team One arrives at the field, collects section A of the Airplane Retrieval System, and parks the VEV as close as possible to the stranded aircraft, still firmly wedged 40 feet up.

8:10am: Begin assembly of "tree snake" contraption (an erector set-like thing that Q might have designed for James Bond on an off day). It consists of four 4-foot long sections, each with a bolted-on brace (which, along with the provided straps, prevents the tree snake from moving). Assembly goes surprisingly well, most likely because SAR Team One reads the directions...for once.

8:20am: Leaning the Airplane Retrieval System against the tree, SAR Team One begins to climb the now-16-foot ladder. Despite appearances, the tree snake is quite stable and reassuring. Unfortunately, even when standing precariously on the topmost step, the Airplane Retrieval System is not long enough to reach the target. SAR Team One descends tree snake and decides to go get the Section B of the Airplane Retrieval System.

8:27am: SAR Team One realizes too late that VEV is not adequate to the task of extracting itself from the mud in which it was parked.

8:45am: After much cursing, prayer, and not-so-silent

supplication, SAR Team One finally makes it back to the gravel driveway on which he should have parked in the first place. Behind him, a series of looping, deep tracks (donuts if you will) are mute testimony to the terror-filled moments spent trying to extract the VEV from the tractionless trail. SAR Team One pauses to silently reflect on how close he came to plunging over the edge of the hill, which would surely have been curtains for the VEV, not to mention SAR Team One's heretofore barely sullied reputation.

8:50am: Having obtained section B of the Airplane Retrieval System, SAR Team One parks the VEV....safely on the gravel this time....and returns to the tree in which his rain-soaked airplane rests....silently mocking his futile efforts.

8:53am: SAR Team One assembles Airplane Retrieval System and leans it against the tree before shimmying back up the tree snake. By now, SAR Team One is soaking wet himself, covered in moss from hugging the tree for dear life, yet still oddly confident of his ultimate success. After all, did SAR teams in Viet Nam allow the Cong to stop them when a pilot needed rescuing? Hell no! And in that spirit, SAR Team One makes what he is certain will be the deciding ascent.

9:15am: Despite a 16 foot ladder, 20 feet of ARS, and his own indomitable will, SAR Team One admits defeat. The Airplane Retrieval System is just barely long enough to reach part of the airplane. SAR Team One could poke her, prod her, and curse repeatedly at her, but all to no avail. Her tail is so firmly wedged in the top branches of the tree, none of SAR Team One's efforts are sufficient. Letting the ARS slip to the ground, we try one last ploy....shaking the tree as violently as we can while screaming incoherently at his ill fortune. All we manage to do is wedge her in deeper. SAR Team One descends the ladder once again, disassembling it as he goes. Perhaps one day, it will serve it's purpose for another unfortunate soul. But today, the tree is the victor....again.

9:25am: As SAR Team One lugs gear back to Vehicle Extraction Vehicle, he is sure he hears muffled, laughter from the direction of the trees. He turns, but no-one is there. Shaking his head, slumped in defeat, now SAR Team One must go to work....how will he explain his bedraggled condition and extreme lateness?

SAR Team One decides he'll figure it out when he gets there.

After Action Report, Saturday: Final Disposition

6:30am: Alarm clock doesn't go off for the first time all week. SAR Team One rests peacefully, with visions of a successful SAR Op today....but only after he's well and truly darn good and ready.

9:30am: Cat plants butt on SAR Team One's face, signaling the end of extended rest period. Weather outside....frightful. Dark, gray, rainclouds looming in the west. Better get cracking!

10:30am: Showered, shaved, and full of renewed vigor, SAR

Team One sets forth on what is sure to be the final rescue attempt. First stop, sporting goods store.

10:45am: SAR Team One unsuccessfully attempts to negotiate a further discount on tree snake extension, but grudgingly buys it anyway. All this rescue work has softened his negotiation skills.

11:15am: SAR Team One arrives at club field. Is pleased to see that there are "Sandy's" circling the wreckage, despite the iffy weather. These are truly hardy souls, and they seem not to be bothered by the impending downpour.

12 noon: SAR Team One consults with SAR Team Two, who are TDY for this mission, despite having received a weekend pass from their commanders....I mean....wives. A plan of action is agreed upon. Plan of action consists of SAR Team One making ascent up newly extended tree snake while SAR Team Two waits on the ground to offer encouragement, (or mockery where necessary).

12:15pm: Tree snake is half-assembled when the inevitable happens....torrential rains once again crash down upon the hapless rescue teams. Most of SAR Team Two frantically runs back to flight line to remove radios and planes from flight line to suitably dry locale (club kitchen). SAR Team One, and the lone remaining member of SAR Team Two hastily beat a retreat to SAR Team Two's truck (which, by the way, is much better suited to the terrain that nearly stranded the VEV was on Tuesday).

12:20pm: SAR Teams One and Two reconvene under the club picnic pavilion and decide to ride out the storm there. SAR Teams One and Two use time wisely by discussing the finer points of electric motors, Lithium-Polymer batteries, and computer radio mixes.

12:45pm: Rain finally abates enough for SAR Teams One and Two to break camp and reassemble at the extraction site. Tree snake assembly continues, with SAR Team Two offering advice where necessary. Becomes apparent that SAR Team One will at least have help removing his lifeless, broken body if worst come to worst. SAR Team One wisely puts that thought out of his mind for the time being.

1pm: Tree snake assembly complete. SAR Team One ascends to his destiny....or his doom. SAR Team Two feeds Airplane Retrieval System to SAR Team One. Tree snake is still surprisingly solid and reassuring, but SAR Team One holds on to tree trunk for dear life anyway, having a clear mental picture of consequences if he doesn't.

1:02pm: Poking commences. At first tentatively, and then with increasing enthusiasm. The foam pad on the end of the ARS is sliding against the wet, slick covering of the airplane, but progress is made. First the tail comes loose from it's crook in the branches above. Continued prodding causes the plane to shift, tantalizingly close to breaking free of it's prison. And then....disaster. The padded end of the Airplane Retrieval

System breaks through the wing near the root. SAR Team One is reminded briefly of Darryl Greenamyer and the B-29 that never made it home from Greenland because it burned to a crisp during an engine runup. SAR Team One banishes this thought from his mind. "The plane is toast no matter what I do now....let's just get the job done and go home to our warm fireplace and a stiff brandy."

1:04pm: After a brief respite (still on the ladder mind you) to recover his strength, SAR Team One makes the final push. Each prod or poke of the ARS begins to have serious effect....first she comes down from the branches she was stuck in, but only a few feet lower....then he hits her just right and she pivots so she's pointed straight down, barely supported by some thinner branches....."Look out down there! She's about to fall!"...and finally, with one last shove, she breaks free! She falls straight down, nose first, and hits the ground with a *bang* right on the point of the spinner, but amazingly, despite all the abuse of the past week, the airplane remains essentially intact! The wing doesn't shift, the prop and spinner are unaffected, nothing major breaks off, and it actually looks (from his lofty perch mind you) like this plane may one day fly again. SAR Team One lets out a victorious war whoop that echoes through the surrounding hills.

1:10pm: SAR Team One begins the final descent, unstrapping the tree snake braces as he goes. This simple hunter's tool has served a far more noble purpose than that for which she was designed, and SAR Team One is grateful to it's designers. Even when he gets his first closeup look at his plane in a week, and discovers that the wooden structure is hopelessly waterlogged, SAR Team One is satisfied with a job well done. SAR Team Two looks on in admiration (or was it amusement?) as SAR Team One breathlessly thanks them for their help. The airplane may not have survived, but her soul (servos, receiver, etc.) will live on in another plane one day.

1:15pm: Together, the teams lug the ladder, the plane, and the Airplane Retrieval System to the SAR Team Two truck for the triumphal return to their base camp (clubhouse). Photo's are taken, congratulations offered all around, and SAR Team Two disperses to their home bases.

With a lone pilot flying his foamie on the field behind him, SAR Team One begins to disassemble his plane for the long ride home. He contemplates the adventures of the week past, and begins to plot his next project. Perhaps another Mach II....or maybe something a little different. Winter lies ahead, and the endless possibilities already have him envisioning a new season of building, flying, and associating with the great people in this awesome hobby. Yes....SAR Team One is well and truly addicted.

Later.....MUCH later....

Despite all odds, that Sky Raider DID fly again, albeit briefly. After the wood dried out, I proceeded to remove the old covering from the wing, and over a period of months, recovered it with fresh Monokote (give me a break....I'm a slow worker!). And as first attempts go.....my covering job

looked....well... awful. But the wing was straight, it was strong, and as God is my witness, that un-fixable plane flew!.....until I crashed it into unrecognizable toothpicks on its second tank. You know how they say all our models have an expiration date written in invisible ink? I don't know if that's true, but I do suspect this one had a death wish that no amount of love and attention from me was going to prevent. I hope your planes are far more forgiving, survive years beyond their expiration date, and provide you with much joy!

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