

Radi- C- ntr- lled SoaringDigest

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Front cover: Jack Cooper and Joe Chovan fly in close formation with a pair of Leading Edge Gliders Lockheed P-80 Shooting Star slope jets. Photographed at Wilson Lake Kansas by Dave Garwood using a Canon EOS 40D and 70-200 f/4 lens. ISO 800, 1/750 sec., f8.0, 160mm

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Matt Tillman's Super J-II RES electric sailplane, a plane specifically designed to take advantage of the lack of a zoom on electric climbout. It's powered by an Axi 2212/20 turning a 10x8 prop, with an AUW of ~22 oz, depending on ballast. The pod and boom are from Art Hobby, the fin is that of an Allegro, and the wing and stab are Matt's design. Photo by Julie Tillman at the field of the Patuxent Aeromodelers in Hollywood Maryland.
Canon PowerShot A630, 1/1250 sec., f3.5

R/C Soaring Digest

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In the Air

The R/CSOaringDigest Yahoo! group celebrated a milestone on August 21, shortly after the September issue was put on-line, when an *R/CS* reader in France became member number 1500. Membership in this group is, of course, just a fraction of the total *R/CS* readership. And yes, readership continues to grow.

A recent issue of another popular RC aircraft magazine reviewed the Great Planes ElectriFly L-39 Albatross. This molded foam fun-scale model is rather small (the wingspan is just 25 inches) and is designed for electric ducted fan. The \$99 package includes the HyperFlow ducted fan and an Ammo brushless motor, but that doesn't mean you have to build and fly it with those components installed. If any *R/CS* readers are contemplating a conversion of this cool looking model from EDF to PSS, we'd very much appreciate an illustrated article on the process and the result.

We're looking for someone to reestablish "The Tool Room" as at least a somewhat regular column. Dremel's Multi-Max™ Oscillating Tool System, scheduled to be available in October, would make an excellent first subject. If reviewing newly introduced and/or less common tools sounds like something you'd like to do, we encourage you to contact us.

Time to build another sailplane!

The F3J Experience:

Seattle 2006...

Chicago 2007...

Adaparazi 2008

Sherman Knight, duworm@aol.com

In December 2006, Dave Beardsley mentioned to me that the F3J World Championships in 2008 would be in Turkey and that we should see if we could qualify our kids. Sounded interesting, especially the Turkey aspect of it. "I'm in, sounds cool." What I didn't realize at the time was I was about to experience the most difficult thing I have done since I started flying — handing a perfectly good, brand spankin' new Carbon/Kevlar sailplane to a 13 year old with a smile on my face while saying "Have fun out there," and walking away.

And not once, but with three different planes!

At the time, I only knew one thing about F3J. A couple of guys with track shoes towed the plane on launch. My learning curve was going to be steep, but what the heck, we were shooting for the World Championships!

F3J has lots of rules, lots and lots of rules. Towline length limits, tow bridal construction restrictions, safety zone flight limits, parachute size restrictions, launch windows and a bunch of others.

Even the line used for launching was different. In Thermal Duration, slap on some #300 line and go. In F3J the towline is monofilament. Sounds easy, but you really wanted a certain brand of mono. Something called "Speedline" was the mono of choice. A quick Google search and NOTHING, zip, nada. It took months to track this stuff down. And you need it in at least three different diameters. The more stretch (lighter line) the better. Unfortunately, as headwinds increased on launch, the lighter line would break, requiring a heavier line. Balancing the weight of the aircraft, the strength of

the towmen and the strength of the headwind was required to select the correct size of the monofilament tow line. Too heavy and the launch suffered. Too light and the line broke. And you did not want to break a line. Break a line once and that flight just became your throw-out round. Break a line a second time and you did not make the fly-offs. In other words, no podium for you.

Each competitor is allowed only three aircraft for the competition. At the World Championship level this means three primary aircraft. A primary with a couple of old planes that are still in pretty good shape does not cut it. Unfortunately, you really need more like four or five. (The reasons will become clear later in this article.) You are not allowed to replace any part of the aircraft like a new fuselage or a new wing tip panel. But you are allowed to repair them all you want. Bring your repair kit, because you WILL be doing repair work. What is it about F3J that damages more aircraft than a Thermal Duration contest?

F3J does not allow landing skegs of any kind. Hard dork landings aren't just typical, they are required. In addition, there are lots of planes in close proximity to each other. Because scoring for each round is Man-on-Man, up to 16 aircraft launch at the same time from lanes only 35 feet apart. That also means 16 aircraft setting up for approach at the same

time. Because of the follow-the-leader mentality many competition pilots have, that also means up to 16 planes in the same thermal at one time. You guessed it, F3J is a contact sport!

Daryl Perkins reduced the entire strategy of F3J to one sentence. "F3J is all about the first three seconds and the last three seconds." Huhhh? Like Thermal Duration, the clock starts when the plane comes off tow and starts when the plane touches a ground based object. Unlike Thermal Duration you must launch and land in a ten minute window. In other words, it is impossible to get a ten minute flight within a ten minute window. Time on tow and landing early is subtracted from the ten minutes. To make the fly-offs, you get one throw-out, you make your time in all the remaining rounds, you launch in less than three seconds and you land inside the last three seconds. This strategy will work at the local contest level, but it will not be enough to make the fly-offs at the World Championship levels.

Man-on-Man scoring takes the best score in the round and gives that person 1000 points. All the other pilots' scores are normalized against that 1000 points. So, if all the pilots in the same round land early, the best score still receives 1000 points. Under this system, no pilot is penalized for being unlucky enough to

fly a round in bad air when the rounds before and after flew in great air.

F3J rounds take place in a ten minute window. If you land early, that may have just become your throw-out. The aircraft may not leave the thrower's hand until the window opens and the plane must land before the ten minute window closes. If you launch early, you must re-launch in that window. Oops, that just became your throw-out. If you land after the window closes, a severe point penalty is assessed. Darn, another throw-out!

There are other "throw-out" causing events. Land more than 75 feet from the landing zone, another throw-out. Fly over a safety zone under three meters, "Oops I did it again."

Unfortunately, you only get one throw-out leading up to the fly-offs. In the 15 minute window fly-offs, if six rounds are flown, there is another throw-out.

The Selection Trials

The road to the World Championships goes through the selection trials for each country. For Team USA, the selection trial were sponsored by SOAR, the local Soaring club near Chicago in September of 2007. By March of 2007, there were three Dads and their sons going to the trials from the Seattle area. Dave Beardsley and his son Brendon, myself and my son Michael, and Jim Laurel and his son Connor.

Jim Laurel found a bunch of the hardware we needed from Skip Miller. Grinders, spools, tow pulleys, F3J chutes and a bunch of general knowledge. Thanks Skip. We traveled to a TD contest just outside of Vancouver BC Canada and got a bunch of hands-on help from Arend Borst, past F3J World Champion. Thanks Arend. By the beginning of Summer 2007, we had all the equipment and some great advice, but we still did not have any contest experience.

Then we met “The Damn Canadians,” actually a group of Americans that have been going to the selection trials for years and just like the name. Amy Pool, Kelly Johnson, Bill Hanson, Dave Portwood and Jim Frahm provided us with a lot of help and asked us to join their team. This provided us with towmen, support staff, throwers, and a horse trailer that drove from Portland to Chicago and took all our planes and equipment. I cannot begin to tell you how much help it was to have experienced people around to guide us. Thanks everyone.

Nonetheless, the lack of actual contest experience still bit us in the butt. When we arrived at the selection trials in early September, 2007, during practice, one of Michael Knight’s three planes suddenly had a case of confused electrons and an intermittent fault forced us to retire the aircraft. The decision to retire the

aircraft rather than try to repair it would later come back to haunt us. Then in the very first round, lack of familiarity with the rules struck. Michael thought that flying over a safety zone would penalize his flight, so he elected to fly around the safety zone. (The actual rule only penalizes a pilot for flying under three meters over a safety zone and Michael was way above three meters). Flying around forced a landing 78 feet from the landing box, just three feet outside of the 75 foot limit. The result was a zero flight. Michael’s very first flight was his throw-out. Yikes!

By the second to the last flight, Michael climbed into second place, just behind AJ McGowan, with Brendon Beardsley in third. BAM! Michael mid-aired with Nick Tasco. After the planes separated, Michael started flying the wrong airplane! The uncontrolled descent of his primary plane (a really nice red and white Supra) resulted in a plane that was no longer safe to fly, no matter how much you tried to repair it.

Under the rules, the mid-air gave Michael and Nick the right to re-fly the round. Unfortunately, our earlier decision to retire rather than repair one of the back-up aircraft left Michael with a single backup plane that was not well suited for the conditions in Chicago. Brendon moved up to second, Michael fell back

to fourth, and Jeffery Walter made the Junior team finishing in third.

So Team USA for 2008 consisted of Daryl Perkins, Ben Clerx, and Rich Burnoski, and Skip Miller as alternate for the Seniors. The Junior team consisted of AJ McGowan, Brendon Beardsley, and Jeffery Walter, and Michael Knight as alternate. In addition, because he won the junior event two years earlier, Cody Remington received an automatic bid to the World Championships.

Right after the Selection Trials, the next order of business was to select Team Managers for both the Senior and Junior competitors. Jim Monaco was chosen for the Seniors and Mike Lee was chosen for the Juniors. It is impossible to explain how much work these two guys put in to make to make the upcoming World Championships happen. We cannot thank them enough.

Opposite page:

Senior Team, from left - Rich Burnoski, Ben Clerx, Daryl Perkins

Cody Remington, Junior Champion, WC 2006, competing as Senior in 2008

Junior Team, from left: AJ McGowan, Jeff Walter, Brendon Beardsley



Well, Michael did not make the team, but then we found out about the Spor Yapi Cup. It is a two day event right before the World Championships. We could still travel to Turkey and fly against the best from around the world. Because F3J competition is so hard to find in the USA, we decided a little practice in Turkey would be fun.

Turkey

The World Championships are held every other year and hosted by a different country each time. This year the host country was Turkey. Jim Laurel, the world traveler that he is, kept telling me how cool Turkey was to visit. I did not know what to expect, but I had seen the movie “Midnight Express” when I was in college and it scared the crap out of me. I knew that Syria and Iraq border Turkey to the south and the current news was telling me that both those countries might not be a good place for Americans to visit. Istanbul, the largest city in Turkey, is the “City of Intrigue” found in every other spy novel I have read and in several James Bond movies. In addition, my Hollywood education seemed to tell me that I should expect sand dunes, camel caravans, men wearing turbans and women wearing burkas.

Jim Laurel was right in a big way. Turkey was a very cool place to visit and my Hollywood education was way off. Not a single sand dune or camel, and no men

wearing turbans, and only a few women in burkas.

What we did see was HISTORY combined with a modern society. Buildings and structures, some more than 2000 years old, across the street from a modern light rail mass transport system that went by whisper quiet. You could easily spend several weeks visiting real history. I can remember thinking in my architectural history college class, “What is so special about a bunch of old buildings?” After visiting Turkey I can finally appreciate the truly impressive nature of the ancient architecture. Turkey’s freeway system is comparable to anything you would see in the States. McDonald’s, Burger King and Starbucks, just like home. Although I could not read the menu and the person behind the counter could not speak English, I could see the images on the overhead menu, hold up the right number of fingers and say, “Number seven.” Some things on this planet are universal.

The event was held just outside of the city of Adaparazi, a city of about 400,000 and a three hour car ride to the east of Istanbul. On the drive there from Istanbul, we passed highly industrialized areas, huge warehouses, tower cranes and apartments — lots and lots of apartments. It was a dry, dusty environment.

Adaparazi, on the other hand, is in a large valley surrounded by green. It is

heavily irrigated. The city itself is old with very few buildings higher than four stories. Nearly 10,000 died there in an earthquake over ten years ago. Some of the earthquake damage is still apparent. In stark contrast, scattered throughout the city are modern shopping malls. Walk in the door and you can buy some jeans from the GAP.

The next morning, a tour bus organized by the event coordinators shuttled us out to the flying site. A quick jaunt across town in the tour bus shows that Drivers’ Education in the States is much different than Turkey. The bus, alongside other cars and trucks, would whip through roundabouts, traffic lights were ignored by everyone, horn beeping and fist shaking were as much a part of driving as stepping on the accelerator. Cars and trucks flying in formation so close it would impress the Blue Angels.

We finally made it to the freeway and it was just as interesting. Hmmmmm, there goes a car traveling the wrong way down the shoulder. Suddenly the bus pulls a U-turn in the middle of the freeway and, a few hundred feet later, quickly pulls off onto a narrow dirt road. The bus is flying down the dirt road next to a river with banks so steep you wonder what keeps the road from sliding into the river.

Another sudden turn through an opening in a big dirt berm and we saw it. Nirvana — paradise for a sailplane pilot. A HUGE



Tents are a poor description of the shelters provided by the event organizers.

green, well-cut grass field. The field held 16 launch lanes and 16 landing zones with lots of room left over. Anchor points for launching equipment, along with safety zones and large digital clocks, were already set up to allow launching and landing in three different directions.

Just a few moments later we saw the next indication that this competition was going to be the best organized and presented event ever. Team vans. Team Istanbul had not just one, but three team vans, painted from bumper to bumper with sailplane and Istanbul graphics.

Right behind the team vans were raised spectator bleachers and a celebration podium. And just beyond the podium were the tents.

Tents are a poor description of the shelters provided by the event organizers. Think more like metal buildings that used plastic covered



The scoring tent.



The Istanbul Soaring Club vans.

canvas for the roof and walls. Separate sections for each country. A separate tent for the official scoring judges, the CD and his crew, and a separate tent for the transmitter impound. In addition, two covered areas for competitors to hang out and watch the scoring in real time. Yeah, that's right, real time scoring.

Hosting an F3J contest is a manpower intensive endeavor. Each lane required the host to provide an official timer. The official timer would start his watch when you came off tow, and stop the watch when you landed. He was also respon-

sible for verifying your landing score. He would then enter the two scores into a wireless PDA. Once the information was entered, and you verified that it was correct, you would give him your private PIN number. He would enter the PIN number and the wireless PDA would instantly upgrade the scoring computer. As soon as all scores for the round were entered, the scores would print out on big plasma screen TV's in the pilot hang-out areas. In addition, if you had a wireless laptop, you could log onto the wireless network and see the scores update in real time from your own tent. Absolutely incredible.

The Spor Yapi Cup

Before the World Championships, you get to warm up in a F3J mini-event called the Spor Yapi Cup. Just four rounds (because there are less than six rounds, no throw-outs) and the best 15 pilots then fly in a two round fly-off. The USA was represented by seven seniors and four juniors. From countries around the world, 153 pilots participated.

Prior to the cup, I had no actual F3J contest experience. Although I had been to F3J events, it was always in support



of the juniors from Seattle so I did not compete.

At the Cup my flight times were in the 9:54 - 9:55 range and I was making my 100 point landings. I was feeling pretty good until after the second round when I checked the posted scores.

I was flying 98.99 percent of perfect and was in 55th place! You have got to

be kidding! Someone patted me on the shoulder and said, "Welcome to the big leagues."

I was calling for Bob McGowan during the Spor Yapi Cup and he educated me on what it takes to win. He really wanted a 1000 point round. As we are standing on the flight line waiting for the window to open, we both spotted some

hand-launch sign on the deck and it did not appear that anyone else saw it. Bob pulled up elevator as soon as the plane left the thrower's hand and was off tow in less than a second. He looped inverted and rolled out, bee-lining for the hand-launch sign. Bob hooked, made his time and landed with a 9:58:55 and a 100 landing. He got the 1000 points that round.

The Cup also gives you the chance to get used to the local conditions. Every morning, the air was still with very little thermal activity. As the day went on, the wind would build to a steady 15 to 22 knots. Most of us are used to gusty winds, but the steadiness of the wind made it deceptive. It just did not feel that windy.

The wind was going to be a problem. We lost planes downwind and we blew up planes on launch.

We also had some throwers that were very impressive. Cody Remington and Bob McGowan could load up the line with the best.

But what we had that no one else had was monsters for towmen. These guys could pull. Phil Barnes and Frankie Burnoski towed for the Seniors and Dave Kalamen (Brendon's stepfather) and Kelly Johnson towed for the Juniors. Towmen, especially towmen of this caliber, are the unsung heroes of any F3J team. Without these guys nothing happens. When your

47	122	<u>Koc</u>	<u>Mustafa</u>	TUR	1985.50 (99.28 %)
48	110	<u>Gergic</u>	<u>Bojan</u>	SLO	1983.60 (99.18 %)
49	126	<u>Ersu</u>	<u>Ali</u>	TUR	1983.30 (99.17 %)
50	154	<u>Beardsley</u>	<u>Dave</u>	USA	1983.30 (99.17 %)
51	136	<u>Chekh</u>	<u>Alexander</u>	UKR	1983.20 (99.16 %)
52	152	<u>Lee</u>	<u>Mike</u>	USA	1983.00 (99.15 %)
53	27	<u>Koudelka</u>	<u>Karel</u>	CZE	1982.30 (99.12 %)
54	55	<u>Lucas</u>	<u>Colin</u>	GBR	1980.00 (99.00 %)
55	156	<u>Knight</u>	<u>Sherman</u>	USA	1979.70 (98.99 %)
56	10	<u>Valchev</u>	<u>Valentin</u>	BUL	1979.60 (98.98 %)
57	72	<u>Gallizia</u>	<u>Giuseppe</u>	ITA	1979.40 (98.97 %)
58	151	<u>Monaco</u>	<u>Jim</u>	USA	1977.20 (98.86 %)
59	161	<u>Adrian</u>	<u>Christian</u>	RSA	1976.40 (98.82 %)
60	42	<u>Laemmlein</u>	<u>Tobias</u>	GER	1976.00 (98.80 %)
61	92	<u>Chisholm</u>	<u>Scott</u>	NZL	1975.70 (98.79 %)
62	159	<u>Goodrum</u>	<u>Craig</u>	RSA	1975.50 (98.78 %)
63	18	<u>Silveria A</u>	<u>Marco</u>	BRA	1975.00 (98.75 %)

At the end of Round 2 I was flying 98.99 percent of perfect and was in 55th place! You have got to be kidding! Someone patted me on the shoulder and said, "Welcome to the big leagues."

team's towmen are as good as these guys, magic happens. An F3J tow is quite different from a TD winch tow. The goal in F3J is to stay on tow for as little time as possible. The monofilament line can be stretched, a lot. Before the launch, it is pre-stretched. It appears that

much, if not most of the initial part, of the launch is the mono trying to un-stretch itself. Then a very, very quick dip at about two seconds to super accelerate the plane before the line returns to normal length and then hard up to vertical. Most thermal duration pilots stop pulsing the

winch right before the ping. In F3J, the towmen are pulling hard right through the ping. In my opinion, trophies should also be awarded to the towmen.

We put a stop watch on Daryl's plane on launch. Daryl was off tow in a little over two seconds and coasted a hundred feet higher than other teams planes that were on tow for over four seconds. Unbelievable!

Dave Kalamen and Kelly Johnson also towed for Team New Zealand. They not only blew up a New Zealand carbon Pike Perfect on tow (broken fuselage), they towed New Zealand to a third place Team finish in the World Championships.

During our practice day and the first four rounds of the Cup we damaged a little hardware.

First day of practice, AJ was standing next to a launch line that ripped his plane out of his hands by a surprise unannounced launch and it fell on a wing tip. A little CA, a little spackle, and almost as good as new.

Daryl damaged his first model in practice. The stab failed under enormous line tension in very extreme conditions. Daryl pointed out to me later that this type of problem happens at a World Championship on the practice days as models are being optimized, tow systems optimized, the entire team is finally together and working in harmony, and

adrenaline is up in preparation. In short, with the large geographical challenges the US presents, there is no way to get everyone together to practice a full tension launch until you get everyone together at the World Championships. The plane flew again with a borrowed stab.

Also during practice, the center panel of Brendon's "lite" aircraft fluttered on launch. We repaired the skins and built a box around the servo connecting the top and bottom skins in an effort to eliminate the problem. It worked. I think that Daryl later built a similar "field upgrade" into his own planes. No flutter the rest of the contest.

AJ McGowan had an off field landing in the Cup when the plane just would not penetrate in the high winds late in the afternoon. Lucky for him, no damage.

Rich Burnoski had a great looking Supra until it hit the thrower's hand on launch. The stab was toast along with the center section. Rich located a new "lite" center section and a new stabilizer. The Team jumped in and repaired the plane in about six and a half hours. Unfortunately, on its first test flight, the "lite" center section failed. The wing, fin/rudder and fuselage were destroyed. The broken fuse was repaired, and the fin/rudder reassembled and reattached. A wing and stabilizer were borrowed from Joe Wurts.



Mike Lee, highest scoring Spor Yapi Cup pilot with a NAN Models model, won this brand new NAN Models Xplorer for his effort.

Over the next several days the plane was repaired and reassembled.

With up to 16 planes on launch at one time, near misses were not just common, they were the rule. As the seconds before launch ticked down, we began to resemble rabid NASCAR fans looking for

the inevitable pileup in turn one of the first lap. All eyes were on the flight line for each launch. You could hear collective gasps from the crowd when near misses occurred. When there was contact, it was spectacular.



Brendon Beardsley feeds AJ McGowan a fish of unknown nomenclature during dinner on the Black Sea. Sometimes not knowing what you've ordered has its positive side.

After one such collision, one plane managed to fly under control (well, sort of under control) with the back half of the fuselage from the other plane firmly imbedded in its leading edge. Rudder, stabilizer, fuselage and dangling control rod sheaths all hanging from the wing of the wrong plane!

Team USA only had one launch where two planes shared the same airspace at the same time. Again, the towmen and throwers made a huge difference. The best way to avoid the NASCAR pileup in turn one is to be the first car into the turn. That way, the crash is behind you. Team USA did something similar on launch.

From a distance, you could clearly see that the extreme loads on the tow line that Team USA was using accelerated their planes to the front and any other planes crossing their launch lane usually crossed behind them.

After four rounds, the USA placed a bunch of pilots in the finals. Daryl Perkins, Rich Burnoski, Ben Clerx and Mike Lee all made the final 15.

At the conclusion of the three round finals (remember, all preliminary scores are thrown out), Daryl was in second with a silver medal, Rich Burnoski was in fourth, Mike Lee in seventh and Ben Clerx in eighth.

Mike Lee was the BIG winner here. Mike was the highest scoring pilot flying a NAN Models plane. As a result, NAN Models presented him with a brand spankin' new Xplorer. It is a gorgeous piece of work. Painted with a mini-metal flake finish and graphics on the wing tips, it is a very impressive plane.

Dinner on the Black Sea

After the Spor Yapi Cup we had a little breather, so most of us got on the bus, and an hour later were on the Black Sea. About half the group went for a swim. Later, we had dinner at a restaurant on the water. No one working for the restaurant spoke English, so we have no idea what we ordered, but it was very good.

The World Championships

The Team Event

There were 77 individuals in the World Championships with teams representing 25 countries in the Senior event. In the Junior event, there were 44 pilots, with teams representing 17 countries. The extreme daily change in weather conditions continued with no lift and no wind mornings to winds in the early afternoon from 15 to 22 knots. Twelve 10 minute rounds were scheduled for the preliminaries and six 15 minute rounds for the fly-offs, each with a single throw-out. Only 11 pilots would make the fly-offs for the seniors and nine for the juniors. In addition, the number of planes flying at one time was reduced from the 16 in the Spor Yapi Cup to just 11 in the World Championships.

There is both a team event and an individual event in the World Championships. The preliminary rounds determine two things. First, it determines who makes it into the fly-offs to ultimately determine the individual winners. In the fly-offs, your scores are wiped clean and your scores literally start over. Second, the preliminary rounds also determine the placing of the team.

Although this was a F3J contest (a thermal event), a slope fest broke out. The tents paralleled a line of trees



directly downwind. The wind, blowing at 90 degrees to the tents with the trees behind provided a little sloping action, directly overhead and well within a rock throw. The slope action, although technically not allowed under the rules, was tolerated for four, five and as long as six minutes. You would be hard pressed to find a single pilot that could claim that

he/she never used the slope lift off the tents.

During practice the day before the Worlds, Brendon landed off field with his Espada RL. Brendon got lucky and could actually see where the Espada went down and walked right to it. The fuselage was messed up, the tail surfaces were trashed, linkage was destroyed and



US Senior WC F3J Team: Ben Clerx, Frankie Burnoski (towman), Rich Burnoski, Daryl Perkins, Phil Barnes (towman), Jim Monaco Team Manager, Cory Remington.



US Junior WC F3J Team: Dave Kalamen (towman), Brendon Beardsley, AJ McGowan, Mike Lee Team Manager, Jeff Walter, Kelly Johnson (towman)



This page: A small portion of the models at the F3J World Championships. Pike Perfects, Xplorers, and more.

Opposite page: Mass launches are the rule, leading to increased chances of mid-air. No launching early, launch late and you minimize your maximum flight time.









One of the big screen plasma TVs set up to provide contest in real time. Very impressive.

servo gears were blown. Joe Wurts repaired the fuselage and Dave Beardsley glued his fingers together repairing the rudder and linkages. The plane flew later as Brendon's backup.

Many pilots chased the thermal downwind; way, way down wind; "Which plane is mine?" downwind. In Round 1, Jeffery Walter went downwind and didn't make it back. The British team found it five days later in a corn field while they were searching for one of their own lost planes. Amazingly, there was no damage.

Ben Clerx mid-aired with David Hobby, two time F3J World Champion in Round 2. They were both way downwind and fairly low. The violent collision tore off the aileron wing tip panel from Ben's Aspire and cracked the tailboom. Ben recovered from the



Bob McGowan can throw really straight and the towers are really pulling. The black box on the ground is a speaker so each pilot could clearly hear the countdown.

spin and managed to fly the plane back to the field! Mike Lee was downwind in the trees looking for someone else's plane when he heard the collision and spotted the falling wing tip panel. Even though Mike got a great spot on where the wing tip fell, it took eight of us, arm span apart and trying to "swim" through weeds and corn taller than us before we found it. Without Mike's spot, the wing tip would still be in Turkey.

The damaged leading edge was cut away and a replacement section from the leading edge of a Supra was cut to fit and glued in place. Some carbon tow impregnated with epoxy was applied to the fuselage and the whole area wrapped in thick Mylar. After allowing the epoxy to cure, the next morning the plane was airworthy.

Also in Round 2, a plane on launch touched the underside of Rich Burnoski's Supra. The plane next to him suffered some wing tip damage and Rich's plane appeared undamaged.

Dave Kalamen and Kelly Johnson, the monster towmen for the USA Junior Team were also towing for Team New Zealand. These two managed to blow up a carbon Pike Perfect on Launch. The plane was repaired with carbon cloth, CA and finishing resin. The plane flew again.

Kelly and Dave changed their towing technique at the request of Dave Beardsley, John Walter and Bob



The Friday before the fly-offs, Mustafa Toc, from Team Turkey, brought in his helicopter to help search for lost planes. Even eyes-in-the-sky were unsuccessful, and none of the missing planes were found.

McGowan (all Junior team dads) and Joe Wurts at the request of the Kiwis. In higher wind they would let the gliders stop them, but not give ground. They also started briefing pilots before each flight on what the towers were going to do for the conditions and directed the pilots to watch their flex and fly the launch, because the towers cannot see what is going on.

I hope you are beginning to understand a monofilament launch with big towmen and a great launcher in a big headwind is way more powerful than anything you will ever see from a Thermal Duration launch. These launches were downright violent! On a Thermal Duration winch, if you over

load the winch, the winch just slows down. It is impossible for a typical TD winch to put the forces on a plane that two monster towmen can do in windy conditions.

Radio issues struck Jeffery Walter in Round 5. Jeffery was using one radio, but like everyone else was taking two planes to the launch area. Confused electronics made his primary plane unflyable. He switched models in his radio to the backup plane and another case of confused electronics. Jeff was forced to retire from the round. Back in the pits, Jeffery successfully bound his planes to his backup radio and finished the competition.



Clockwise from upper right:

Bob McGowan

Barry Kennedy of Kennedy Composites. Barry served as Helper/Assistant, Photographer, etc.



Junior Alternate Michael Knight

Team Manager Jim Monaco (L) and Cody Remington's father (R) check out the scores in real time.



Above and clockwise: Junior Team towmen, Kelly Johnson (L) and Dave Kalamen (R), and Senior towmen Frankie Burnoski and Phil Barnes

Right: What was left of Rich Burnoski's Supra stab after its collision with the launcher's hand, and the result of a lot of repair work.



Below: Ben Clerx working on a Supra stab, and the results of his efforts, a few days later, mounted and ready to go.





Clockwise from above:

The Supra wing donated by Team Japan, cut up to repair various Team USA Supras.

Ben Clerx' Aspire wing following repair after a collision with 2006 F3J WC David Hobby's aircraft.

Dave Beardsley repairing the center section of son Brendon's "lite" aircraft after it fluttered on launch. Notice all of the diagonal repair work. Additionally, all of the servo mounts were reinforced with boxes, strengthening the weak points.

Rich Burnoski's repaired wing tip.



Servicing the radio determined that the confused electrons were in the antenna wire, between the RF output section of the radio and the base of the antenna. We are not sure if it was a loose connection or a broken wire, but the resulting intermittent fault was enough to retire the radio.

After the contest was over, we did the math and determined that all Jeffery had to score in Round 5 to move the USA Junior Team into first place was 549 points.

At about this same time, I noticed that many of the pilots checking their radios into the impound area checked the radio in a radio case. Many of the cases were oversize, which seemed odd, until I realized that the oversized cases actually had two radios in them. These pilots took two planes and two radios to the launch area. Live and learn.

Remember the contact that Rich suffered on launch in Round 2? Well, he thought the plane was undamaged, but now thinks it may have caused enough damage that the plane failed in Round 5 in the high winds and launching into lift.

Cody Remington landed off field in Round 5. His parents looked every day for the next week. Dave Beardsley, myself, and several others spent an entire day looking for the plane. It was never found.

Landing off field at this event not only created an instant throw-out round, but it created a lot of grief for the people looking for the plane. The mix of trees and corn made finding a plane VERY difficult and in Cody's case impossible.

The trees are actually a crop. The trees are harvested every six years or so and turned into toothpicks. They were about 35 feet tall and the canopy created by them was very dense. Mixed in with the trees were fields of corn that was about a month from harvest and already a foot taller than me. If the plane came down in the corn or the weeds surrounding the corn, you had to literally step on the plane to find it.



AJ McGowan wearing his beaver hat. It definitely seemed to have an intimidating effect on the other competitors.

According to the odometer on the bus, the freeway was exactly one mile downwind from the field. One plane was found just several hundred feet from the freeway!

Brendon Beardsley had a mid-air with a parachute from the next lane on launch. That's right, a mid air with a parachute. During launch, Brendon's plane jerked and started flying different. It wasn't until he landed that we figured out what happened. The pilot next to him popped off early. Somehow the other pilot's launch line caught in the gap between the flap and the aileron and as Brendon launched, the chute pulled through his wing, blowing a hole in the center panel, de-laminating the aft portion of the outboard panel, and removing a portion of the aileron. No one actually saw it happen, but the perfect circular indentation from the ring at the top of the chute in the top of



Joe Wurts, Manager for Team New Zealand, helps out with a repair for Team USA.

Brendon's wing was unmistakable. Brendon knew something was wrong with the plane on tow, but he didn't hit another plane. If Brendon had known he flew through someone else's line, he would have been entitled to a re-flight. But not knowing, and aware that every flight might count, he just re-trimmed and successfully flew it out.

The delamination on the outboard panel was repaired, the missing piece of aileron was found and reattached, and a new piece of wing was used to cover the hole in the center panel. The plane flew again.

Daryl did his thing and impressed the crowd in Round 8. Wind is up, line is tensioned to its max, two seconds before the window opens the towmen take off, as the window opens

the thrower releases and BAMMMM, the stabilizer decides to remove itself from the plane. Daryl does not flinch. He rolls the aircraft inverted and lands upside down using the flaps like an elevator. No further damage to the plane. Less than 35 seconds have passed.

Daryl picks up his backup aircraft, wind is up, line is tensioned to the max, towmen take off, two seconds later the thrower releases and BAMMMM, the stabilizer tries to remove itself from the plane. This time the stabilizer remains attached, just one side is broken and hanging down at an 80 degree angle. Daryl uses all the down trim available and has to hold down stick to keep the plane flying. Word travels quickly through the crowd and within seconds everyone is watching. The rabid NASCAR fan mentally has fully taken over and they can smell a crash coming. Will he make it?

Not only did he make it, but he shot and made a landing, too. Then he fell over mentally exhausted.

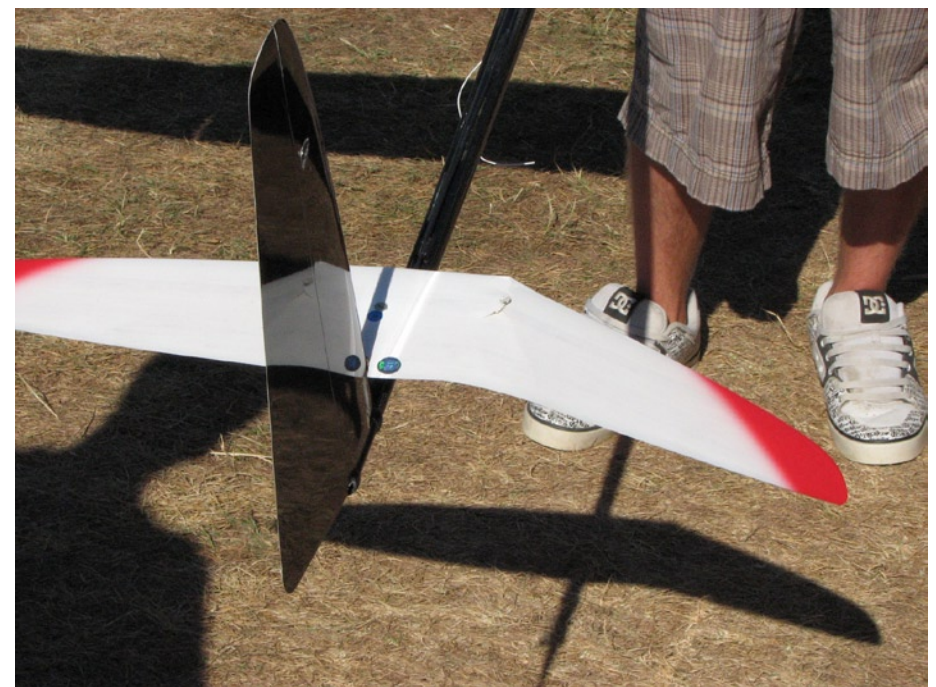
In Round 10, Cody was on approach, about ten seconds out, when he was mid-aired by a competitor. The collision creased his rudder which was easily repaired. Unfortunately, the collision also weakened or possibly broke the glue joints in his rudder/elevator box. It went unnoticed in the re-fly and in Round 11. It is possible that the landing in Round 11 dislodged the box and went unnoticed until the launch in Round 12. The launch was very flat and the plane popped off. Cody, who was in 6th place at the time and tried hard to make his time from a low launch. Unfortunately, it did not happen and Cody slipped from the fly-offs.

After 12 preliminary rounds, the team placing is determined. The seniors finish in 5th place and the juniors finish in 2nd place taking the Silver medal. Daryl Perkins makes the 11 man fly-off for the seniors and AJ McGowan and Brendon Beardsley make the nine man fly-off for the juniors. AJ was flying out of his mind. He finished the preliminary rounds with ten, 1000 point flights in a 12 round preliminary event. Amazing.



Dave Beardsley photo





The Multiplex Cup

The Multiplex Cup was a chance to laugh a little. Multiplex provided a bunch of EasyGliders and made it clear that Multiplex wanted the planes back at the end of the competition. Each team had

one hour to assemble the aircraft. We finished and moved to the flightline for a bungee launch contest. Team USA launches and the Easy Glider rolls over into the ground on launch! The team scrambles, taping the damaged plane back together with blue painters' tape.

They re-launch and the plane pretty much hit the ground like it did the first time. I don't think I have seen so many people laughing this hard all week!

David Hobby, two time F3J World Champion, won the event.





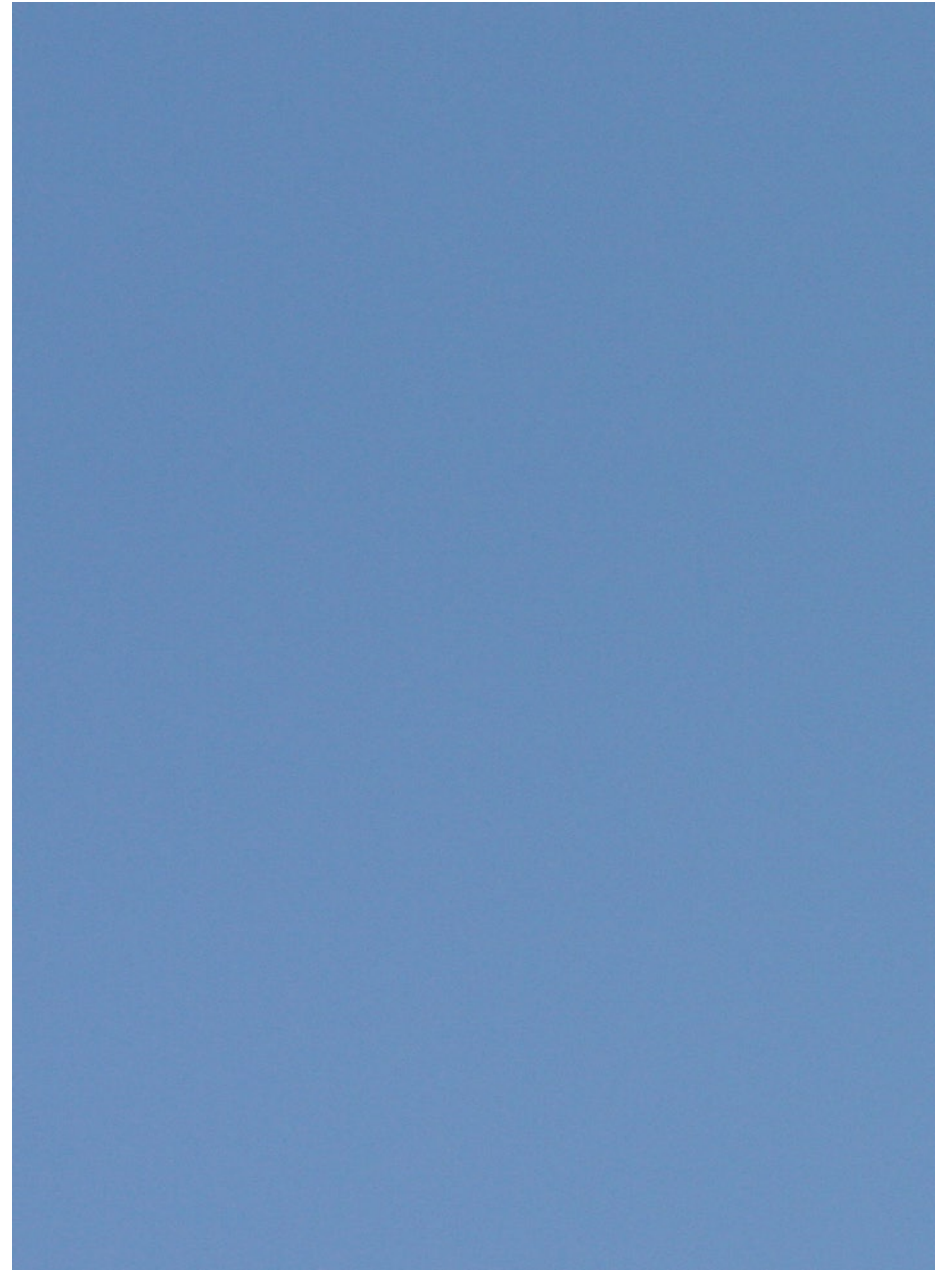
Above and right: Cody Remington prepares to relaunch the Team USA EasyGlider after putting the damaged plane back together with blue painters' tape. The relaunched plane pretty much hit the ground like it did the first time, breaking off a large part of the left wing tip and fracturing the aft fuselage. I don't think I have seen so many people laughing this hard all week! Jeff Walter is on the right.



Opposite page: Contestants in the Multiplex Cup. David Hobby, fourth from left, was the winner.



Left: Demonstration of a 4-man tow.
Photo by Bob McGowan





Above: One of the many collisions that occurred at the Spor Yapi Cup and the World Championships.
This mid-air was captured by Dave Beardsley.

Rich Burnoski and AJ McGowan, with his beaver hat, demonstrate the typical F3J skeg-less landing.



The F3J World Championship Fly-offs The Individual Event

The fly-offs only determine the individual placing. The team event is already over. Unfortunately for AJ, all the previous scores are scratched and the pilots start over with a clean slate.

The fly-offs consisted of six rounds, but the window was increased from ten minutes to 15 minutes. Even with the longer windows, so few were flying it seemed like it was over before it started. All of the exciting stuff already happened. There were no more mid-air or off-field landings for Team USA. No planes exploded on launch. The pilots, the throwers, and the towmen were all acting like a well oiled machine.

Daryl Perkins moved from 11th in the preliminaries to 6th in the fly-off. If a pilot flew five 1000 point rounds, the maximum score would be 5000 points. Daryl was just 8.6 points out of first place.

Brendon Beardsley finished second in junior class, just 3.8 points out of first. AJ McGowan finished in third place, just 5.4 points out of first. The fourth place junior finisher was 226 points out of first.



The US Junior F3J Team with their awards. Mike Lee, Junior Team Manager, on the left; Brendon Beardsley, AJ McGowan, and Jeffery Walter.

The ASC Cup

Immediately after the World Championships was the ASC Cup. This is a two round contest sponsored by the gentleman who owns the field. The windows were 20 minutes and were flown in the windy part of the day. The contestants were the top three junior pilots and the top five senior pilots. That means Team USA had two junior pilots in the ASC Cup. AJ McGowan, just 3.9 points out of first, finished second. Brendon Beardsley finished in 6th place.

Frequency Control

All radios, including 2.4 GHz, had to be checked into the transmitter impound each morning. Frequency control was as tight as I have seen it. Even with all the transmitter control, several planes were shot down from frequency conflicts. The competitors list shows 122 pilots, junior and senior. Of that amount, ten were flying 2.4 systems. Countries flying 2.4 were Australia, Brazil, Israel, Norway and the US. None of these pilots encountered a frequency control problem.

Istanbul

The team manager, Jim Monaco, did it again. The team drove back to Istanbul the night before many had to get on a plane and fly home. Again, Jim Monaco made the arrangements. Several of us stayed for a couple of extra days. The



The second bus, filled to the roof with plane boxes and suitcases.



Ben Clerx' plane box and traveling workshop.



The two boxes (temporarily) lost by British Airways.

hotel was across the fence from Sophia, across the street from the Blue Mosque and the Roman Cistern, and just eight blocks from the Grand Bazaar. This is a BIG city with 14 million people and lots and lots of things to see. We saw as much as we could see in two days. It was an exceptional way to finish the trip.

If you are reading this article and thinking about competing on a World Championship level you are in for a fantastic time. Making the podium is on a whole different level from what you have experienced on a local contest level. The commitment of time, airplanes, equipment and money is BIG and worth every penny.

The only bummer of the whole trip was British Airways. On the trip home, British Airways lost two airplane boxes with a total of 11 planes in them. One of Brendon's planes was signed by many of the best pilots from around the world and is impossible to replace. British Airways has treated the entire issue as if it really is not their problem. I will never fly British Airways again. (Both boxes were found at the end of August in an air cargo warehouse at SeaTac Airport. - Ed)

I am soooooo tired. At the same time, I can't wait to do it again. Both Michael Knight and Brendon Beardsley are young enough to try it again.

France in 2010, here we come!



The US and German Junior Teams hangin' out.

Additional information:

1. For a List of who was flying what plane and radios see <<http://www.f3x.no/f3j/2008/models08.htm>>
2. Official website with all kinds of information <<http://www.f3jturkey.com/index.php>>

3. A rather long thread on the F3J WC on RC Groups <<http://www.rcgroups.com/forums/showthread.php?t=834010>>



Above: Ordering at McD's is easy as long as you stick to numbered meals.

Right: The interior of the Grand Bazaar in Istanbul.

Left: Our hotel for the F3J World Championships.



Wings with a Twist

Steve McKinlay, s.mckinlay@extra.co.nz

I first became aware of Pitcherons/Wingerons not long after I first became interested in flying RC sailplanes in 2000. At the time, threads on RCGroups and elsewhere inspired my imagination of wildly twisting, fast flying slopers. I had no experience with flying sailplanes, but that didn't stop me dreaming of flying these high performance planes. Soon after I bought my first RC plane (an EPP P51) and learnt the basics of flying. My progression of learning after that was similar to most, a couple of EPP planes before my first crunchy (a 2m Mefisto), my first molded plane and various other planes over the next six or so years.

A little history first. As far as I have been able to research, wingerons have been around for a long time with the 160" Hegi SB10 wingeron in the late 1970's along with the Sailplanes International Axel in Europe and the Bridgeman Snipe in the US of around the same era being some of, if not the earliest designs using this control method. Others since then have modified well known planes like the Hobie Hawk and Sagitta to wingeron design.

The pitcheron control was invented as far as I can see by Ken Stuhr of VS Sailplane fame in the late 1980's when he designed and built the now famous Rotor. Ken designed and built what are considered by many to be some of the finest (and now rarest) examples of pitcherons and wingerons: the Rotor, Vmax and Xica.

These slopers were responsible for inspiring others to design their own TWF planes.

The slopes around the Tri City area in Washington State (Eagle, Chandler and Kiona Buttes) and the Northern Californian coastal slopes are perhaps the spiritual home of the TWF (twisty wing fetish) designs. This is where Ken and others such as Charlie Richardson and Harris Nelson designed, built and flew their planes and made them famous.

Since then others have fallen in love with the sleek designs and high performance and have designed and built their own, some going onto commercial production. Examples include the Charlie Richardson Turbo, Tom Feldvebel's Kestrel, Sig Samurai, Harris Nelson's Shrike and others including Harley Michaelis' Orca.

Recently there has been renewed interest in production models including some short run of kits such as the re-released Shrike and Shredder, the Pica and Ultron. The term TWF refers to both twisty wing types, and was thought up by Brian Courtice in his Ultron build thread on RCGroups. It was taken from a related term: PNF (or pointy nose fetish) which was coined by Brian Laird to describe the predilection for pointy fuses of the fast and heavy planes which originated in Northern California.

Other priorities overtook my life (I was finishing Uni at the time and just starting my first serious job and lost a lot of

my spare time) though I still kept flying whenever possible. I had come across the Orca, a 70" pitcheron designed and built by Harley Michaelis – a well known sailplane designer and builder (including the Genie line and the RDS) and fell in love with the sleek purposeful design, but never figured I would be able to build one.

Years later, after some more experience in flying and building, I came across the plans, Harley was generous enough to make them publicly available with the help of his friend and TWF guru Jay Decker. The design was for a slab sided fuse made from wood, ply and balsa and covered with fiberglass. At the time, I had little experience in building planes from scratch, but was playing around with building wings with a vacuum bag. The plan appealed to me in a number of ways – it was a beautiful plane, it looked easy enough to build, I could attempt my first complete vac bagged wings, and it was a pitcheron. So I printed the plans, bought the wood as well as some high power servos and started to build.

It came together much easier than I was expecting (with a lot of help via a build thread on RCGroups). I'm no master builder but I found the plans easy enough to understand and managed to get through without any major dramas.

I did change the plans in one crucial way – a fellow RCGer had generously donated a pair of beautiful machined

aluminium bell cranks to operate the wings. These were designed and machined by Doug Boyd and were installed with the drive pins at the trailing edge of the wing. Other than the drive system for the wings, the fuselage was built the same as the plans. It did come out a little heavier than I was hoping, but it proved to be very strong.

The wings were built a little differently than the plans. I followed Jay Decker's article on installing sparless joiners for twisty wing planes (see <<http://www.slopeflyer.com/twf>>www.slopeflyer.com/artman/publish/twf> for more details). The cores were the original e374 thinned to about 8% and cut from polystyrene and sheeted with balsa and 3oz fiberglass. The finished wingloading came out at 24oz/sq ft, meaning that it was by far the heaviest and fastest plane I had ever seen or built.

About half way through the build, I was lucky enough to convince my fiancée that I needed another pitcheron, and managed to get onto the list for the last run of the Sky Kings RC Products Shrike, a re-release of the famous Harris Nelson 60" pitcheron. As I was working in a winery in New Zealand, I wanted to finish and maiden the Orca before harvest began (mid-March) as I was working flat out for the six or so weeks that harvest runs. Thankfully I was able to complete it in time and managed to have a number of flights before the harvest began.

To say that I was nervous before my maiden would be an understatement. I had set up the controls as per Harley's plans, but never having flown, let alone seen, a pitcheron before, I was unsure what to expect – other than it would be a handful trying to land (no flaps/spoilers and a heavy slippery design).

The day of the maiden saw my flying partner and I at the top of our favourite slope in 45kph winds. I'd flown my Destiny and seen my friend maiden his heavy PSS Hawker Hunter so I was pretty sure that it would be able to fly.



Detail of the wingeron/pitcheron system.

We agreed that Dan would launch for me, both so that I could have both hands on the controls in the event of a mishap and so that it would receive a proper throw.

I tested the controls with Dan hanging onto the plane at the lip of the slope – all throws were correct and felt good, so I gave him the nod.

A heave into the lift made it pitch up violently and I had a few thunderous heartbeats before I managed to get it down safely with little damage. We patched up the damage and I dialed in some down trim before Dan walked further down the slope and threw it off again. This time I was ready for the sudden lift and kept it under control, though I did need every bit of down trim to get it flying level. The lift was huge, probably nothing compared to somewhere like Eagle Butte, but for me it was a wonderful moment. A scratch built high performance plane flown in big lift – just slightly addictive!!!

The plane felt at home in the air, the heavy AUV meant that it cut through the turbulence that I had struggled with when flying my Destiny, and meant that it flew fast.

All the controls felt very precise, almost digital like, so much so that after only a few passes I did a fast pass and rolled to inverted six feet across the front of the slope.

Rolls were fast and smooth, while the elevator was smooth without being over responsive. To be honest, I only flew it for about 10 or 15 minutes. The release of adrenalin was too much and I began to think, somewhat nervously, about landing.

I ran a couple of approaches to get the feel of the landing zone and how the plane felt in the rough turbulent air. The first was a little high, however the second from the opposite direction felt right if a little bumpy, so I put her down firmly. Stories of tip stalling while loitering over the LZ were in the back of my mind. To say I was elated would be an understatement, we were both very happy with the day and left to go home, talking nonstop. Two successful maidens left us both wired.

Sometime after the maiden, I found a new slope that put all our others to shame. With 150m or so of steep front, 600m wide, a smooth laminar LZ with few rocks, and the approaches for the wind were super smooth. Nothing across the river flats to impede the flow of air for kilometers, this slope quickly became known as the “Mecca.”

While the wind wasn’t as strong as the day of the maiden, there were some very strong thermals cycling through. I launched — no easy feat by myself — into some great lift and spent the next 15 minutes or so doing endless pumps, aerobatics and speed runs.

One thermal I found gave me some nice height for a speed run across the slope, so I put the nose down and let the plane gain some speed. About 50m before I was going to level out, one of the wings folded in the blink of an eye, and the fuse went into a ballistic trajectory heading south. I didn’t see the landing, but was sure I would be picking up the pieces to put in plastic bag, so I was shocked to see that there was almost no damage. The horizontal tail surface had broken off the fin, and there was a small crack in the fuse. Other than that, there was a brown scar where the nose had dug a hole 25cm into the hard dirt. The wings were different,. The one that had folded was completely beyond recovery, so I packed up and went home depressed...

Harvest came and went, my Shrike arrived, was built, maiden and flown a lot, but always in the back of my mind was the fuselage of my Orca sitting in the midst of the spare/model room waiting for a new set of wings.

A local RCGer was generous enough to volunteer his time, expertise and equipment to help me build another set of wings. I settled on a slightly larger wingspan (2m), both to give me a larger plane and to bring the wingloading down, but I stuck with the original 8% e374. This time I cut the cores from blue foam and vac bagged on white poplar sheeting with 3/4oz glass and a carbon golf club shaft spar out to 50% span. They came



Shrike

Orca and Shrike



Orca

out light and stiff and looked up to handling full speed dives.

We built the wings just before my fiancée and I moved back to Australia, so unfortunately my mentor was unable to see it fly.

Here where we have based ourselves in North East Victoria, slopes big enough

and with a nice LZ to land a slippery plane are few and far between. Then the winds have to come from the right direction, and unfortunately they are also rare, so it was some time before I was lucky enough to get some wind that was good enough for a maiden.

The slope I maiden it for the second time is a superb one, a huge meteor crater many kilometers across and 200m or so of steep slope.

I had already flown my heavy Destiny, so felt confident enough to launch the Orca. A few dry run launches to check the direction of the throws and get my arm moving again and she was away.

Although the lift wasn't big, there was enough to get some height for some gentle speed passes and carving turns.

Since it had been some time since the original had flown, it was so nice to see it in the air again and hear the turbine whistle as she flew past. The lift was good despite the low wind-speed, so the noise was very clear and very different from any other plane I've heard.

The lighter wingloading was apparent — down to a little over 18oz/sq foot — though I was unable to get more than about 75m above the slope. A successful if bumpy landing meant that I was ecstatic. I was taking her home in one piece again.

I then rebuilt the heavy tail and managed to shave another few ounces off the wingloading (down to just over 16oz/sq foot) so the second time I flew it in decent lift, I was able to really wring it out.

Fast passes were addictive, half pipes were endless, and the energy retention was excellent, with endless Cuban 8's



being a highlight. There were a few large thermals that passed through giving me enough height to do some really fast runs with no sight of any wing flex. Again, the feeling of the controls was of digital response and smoothness, fast enough for aerobatics and drill-like rolls, but accurate enough for precision flying.

To me flying a pitcheron feels like a well setup plank wing. You can't "yank and bank" it, but it has to be flown around the turn to get the most out of it. Yes, I know theoretically it should be no different to a conventional plane, but that's how it feels. They like to be flown fast and not hang around in the lift. As clean models with little drag, they quickly accelerate and hold their speed excellently.

I was shocked the first time I hand-launched my Shrike on a football pitch at how quickly it accelerated out of the turns. On a good slope in decent lift a few well strung together turns quickly piles on the speed.

I've yet to have either my Shrike or Orca drop a wingtip, and they thermal as well as my molded HLG. The Shrike is a lighter, smaller pitcheron (60" wingspan and AUV of 21 ounces) but as it is no longer available it is limited to slopes with excellent LZ's and good lift. It also thermals superbly and has a good turn of speed for such a low wingloading. The only downside to the Shrike is that

it does take some planning to land it consistently, such a drag free design means that it glides forever.

Being a V-tail, it possible to pack it down into a case about the same size as a small-bore rifle. This is perhaps the best performing plane I own, being able to fly in thermals along with up to 80kph winds without ballast at a wing-loading of around 11oz/sq foot.

I love both of my TWF planes, but my Shrike doesn't have the soul that the Orca does. It's a bit like comparing a high performance F1 car to a muscle car. The muscle car may not have the high performance of the F1, but the muscle car wins hands down in that they have their own "character."

I am now planning a scratch-built 100" wingeron of my own design with a split rudder and pop-up canopy for airbrakes.

Having been bitten by the twisty wing bug, it is impossible to recover: the speed, precision and lightning rolls are highly addictive. These little known planes are the thoroughbred speedsters of the sky, and I'm sure my arsenal of planes will always include at least one.

Thanks to Jay Decker and Doug Boyd for checking my history section and Frank Slaughter for the photo of Harley Michaelis' Orca flying during the 2007 Tri-Cities Six Pack event.

Glossary

Pitcheron: Both wings rotate in the same direction for elevator input and opposite direction for aileron input. There is NO elevator or aileron surface. The whole wing rotates in response to the input.

Wingeron: Wings rotate in opposite direction for aileron control, but the plane has a normal elevator, either all moving or articulated.

Both can have a normally functioning rudder and can often be built as either configuration.

Websites

<<http://www.slopeflyer.com/artman/publish/twf.shtml>> Plane reviews and dedicated TWF construction articles and plans written by guru Jay Decker. The plans for the VS line of pitcheron and wingeron planes are available via this website courtesy of Ken Stuhr.

<<http://www.genie.rchompage.com/>>www.genie.rchompage.com> Orca Plans

<<http://www.rcgroups.com/forums/showthread.php?t=773984>> Original Orca build thread with Video of maiden

<<http://www.rcgroups.com/forums/showthread...php?t=904412>> Re-build of Orca.



Miles and Storks mean Smiles and Turkey

Sydney Lenssen, sydney.lenssen@virgin.net

Lucky enough to be in Istanbul two weeks ago, Murat Esibatir and Philip Kolb kindly invited me to their local two-metre competition.

The club's field is about an hour out of the city and almost under the flight path of the city's second airport on the Asian side of the Bosphorus.

No surprise, the field is also a few minutes away from the new fineworx factory where "Miles," the new two-metre competition glider, is coming off the production line, first of a series of models planned to be manufactured by this dynamic duo.

What a fantastic fun day was enjoyed by all, about 24 pilots, friends, girlfriends, children and helpers, in weather which ranged from 30 to 35 degree Centigrade, scarcely a cloud in the sky, thermals aplenty and a vital need to drink as much water as possible.



Philip Kolb with a characteristic overarm launch, this time from a bungee with the new cool "Miles", the all-wooden 2 metre competition glider from fineworx, the new model manufacturer in Turkey.



A clutch of Miles, the new two metre class glider produced by Murat Esibatir and Philip Kolb, and already a hit with the Turks. Kits for what has been described as a “small F3J model dressed in sheep’s clothing” are available in the US from Kennedy Composites.

First an outline of Turkey’s two metre rules. The model must be all wood and no composites, only rudder and elevator/v-tail and two servos, launch is by bungee - 30 metres of cotton covered rubber to limit extension to roughly twice normal length - and 100 metres of line. Pilots fly man-on-man in 9 minute slots with a maximum allowable flight time of six minutes. A standard F3J landing tape is used to score landings and overflights are penalised by deducting the number of seconds over, up to a 30 second maximum. Pilots can launch as often as they wish, the last flight and landing counts as the score.

Toughest part of the contest is to land accurately and close to the 6 minute target. With only two controls, it is not easy to get the glider down out of a thermal and slow it down to a pace which allows you to land on the spot without damaging your model. From what I hear, the United States has a two-metre class, still popular for club contests, and there a third servo is permitted and used to control a spoiler. The option of a spoiler will become part of Turkey’s rules for next year’s competitions.

Many F3J pilots have visited Turkey in recent years to compete at Riva on the Black Sea coast and at Adapazari where the world championships were held this summer. They will vouch for the high standard of organisation and facilities which the Turks lay on. While not

quite as grand for this club competition, everybody on the field mucked in to make sure that the event ran smoothly. Every pilot in the three slots per round had an independent timekeeper and scorecards, the computer churned out results, when the timing system broke down, a loudhailer was used to start and finish slots and check that all pilots were ready. Regular breaks were called to eat and drink. Pilots went out to the line with two helpers, one to act as spotter and count down the six minutes, and one to retrieve the bungee in case a second or third launch was necessary and sort out any crossed lines.

The standards of flying was very mixed. Everyone knew that Philip and Murat were international standard, several others were well experienced while others were at various stages in the learning process. Each slot had mixed abilities, rivalries were intense and ribbing and joking went all down the line.

A number of the pilots had yet to be indoctrinated into Dave Thornburg's "River of Air" guidelines. They persisted in pushing upwind where they were confident that the factory roofs were going to lift them to the clouds. Ozgur Vural is an experienced model helicopter and power flyer, but thermal flying is different. He had yet to be convinced that it is worth following a thermal downwind. But after flying out his six minutes in three consecutive rounds, with



A few of the happy band of two-metre pilots at the end of the day, with the jet overhead on its approach to Sabiha Gokcen airport on the Asian side of Istanbul.



The model is easy to spot as it breaks away from the flock in this enlarged photo. The storks seem to be just as good at avoiding man-made objects as their own kith and kin!

his spotter shouting “fly downwind,” he was convinced and his smile was almost two metres wide!

But the highlight of my day were the flocks of storks. At one point there were five separate darkish clouds of the majestic birds spread across the sky from north to south, storks returning to Africa across the Bosphorous from northern Europe. Each cloud paused almost stationary in the sky, a thousand or more storks thermalling and gaining height before breaking away to catch the next batch of lift. How do they all circle so closely, seemingly in random turmoil, certainly not all in the same direction, without any collision?

But whether it’s one stork or a thousand, when they circle it means lift! Several of the two-metre models went up to join them, and again, even when models were in the thick of the flock and hard to distinguish and keep your eyes on, there were no collisions.

When Philip launched almost into the base of the flock, he cried: “I hope their radar is good,” and amazingly half a minute later, I saw Philip’s model flying above the flock and to one side. I hope that a reader somewhere will explain this phenomenon.

It appears that a well trimmed model glider will climb faster than the typical stork in the same thermal. I am confident that Nature has blessed the stork with super thermal reading skills and fine-feathered aerofoils. If the stork is not climbing as fast as the model, then either the bird did not want to climb fast in the lift or its wing loading was higher than the model.

Whatever the explanation, the storks were a wonderful sight to see and provided a wonderful bonus to super contest. ■

One of what was at one time five flocks of storks thermalling over Istanbul’s two metre class thermal glider contest, and not one collision. See if you can spot either of the two gliders in that lot!



What a landing!

Daniel Bizzera, Daniel_Bizzera@carrefour.com>

Hello, friends.

Here, I share some photos. In those you can see me and my model, after a landing...

Notice how the cone stayed fixed in the ground!

The Timekeeper did not know how to measure the distance to the base of landing!!!

Finally, he measured three meters from the nose of the model.

A good landing for me.





Klingberg Wing 100

Revisited



Tom Nagel, tomnagel@iwaynet.net

Rol Klingberg built and flew hang gliders and flying wing sailplanes. You can find a picture on the internet of Rol piloting his full scale flying wing hang glider, sitting in a hole on top of the thing with his head sticking out, looking for all the world like Santos Dumont getting ready to cross the English channel in some alternate universe.

All across America are there are two meter spruce and balsa Klingberg Wings, stuck up in the rafters of the basements of RC sailplaners — some still in the original box. Some folks swear by them, and some folks still swear at Rol for kitting the darn thing in the first place.

Somewhat less common is the Klingberg Wing 100, the balsa-over-foam core five servo floppy-winglet wonder from the early 1990's. This story is about my adventures with the KW 100. But the story starts a little earlier than that.

I started flying RC in 1993, and soon after getting control of my Goldberg Sophisticated Lady I started looking around for my next plane. The 2M KW caught my eye. Due to my limited building skills, that was probably a mistake. I eventually got it into the air, but it was truly a dog. The sliding tray mixer, as I built it, neither slid nor mixed. I got a computer radio and solved that problem. The 2M KW wallowed in flight, with adverse yaw that had to be seen to be believed. I learned about the floppy winglets on the big KW and fashioned some of those for the 2M, and the plane became manageable in flight, but it was not a pretty thing to watch.

I never thermaled the 2M KW, not even once. Its major achievement in flight came on the slope over in Newark, Ohio, when it flew right through a Zagi LE and cut it in half. One day while bungee launching the KW, it achieved lock-out, spiral divergence and total destruction, faster than I can input those words into the word processor. I gleefully ripped out the electronics and stuffed the tattered remains in a trash barrel.

Thus, I find it hard to explain to myself why I wound up buying a completely built KW 100 a couple of years later. I guess I just have a thing for wings.

Tom Hoopes of Sandy Utah had advertised his completely built KW100 for sale on the RC Soaring Exchange. He offered it complete with servos and battery at a very reasonable price. I had heard that Tom Hoopes was an immaculate builder, and when the big box arrived via UPS I was soon able to attest to that. The cardboard shipping box itself was better built and better looking than any of the planes I had constructed to that point. I still use that box to store and transport the KW100 to this day.





Even before I had the big Klingberg programmed into my new JR radio, I put took it to the Westerville Ohio RC show and entered it into the static display competition. It won first prize in the sailplane division. Now it was time to try to fly it.

The KW has five servos: one each for the two elevons; one each for the two flaps; and one servo in the radio compartment to slide the big Nicad battery back and forth, so that the CG can be adjusted in flight. For some reason, I was having trouble getting the two flap servos to act in unison. We finally got that more or less straightened out, although to this day the two flaps drop at slightly different rates. As it turns out, that doesn't matter much.



Tom and his Klingberg Wing 100 at the thermal field. Because there are no hand-holds, Tom devised a rather clever foot pedal release mechanism which works extremely well.



The KW 100 awaits another flight. Hey, is that a Flamingoid off the KW left wing?

Don Harris kindly donated several hours of his time helping me program the KW100 onto my JR 783XP. Tom Hoopes sent me some long emails with suggestions. All it took was the advice of these two experts and several evenings of my time, and I was ready to go. (I don't think the folks at JR anticipated a flying wing with dual flaps and an adjustable CG when they designed the 783.)

One control that didn't need any work at all was the floppy winglets. Rol Klingberg devised a set of winglets that are free to rotate outward only. A metal pin stops the inboard rotation. The intended effect

of the floppy winglets is to eliminate adverse yaw. When I did the math to work up the KW100 specifications, I was surprised how small the winglets actually are: each one is only $17\frac{1}{2}$ square inches, equivalent to a square less than $4\frac{1}{4}$ " by $4\frac{1}{4}$ ". My Zagis had more winglet that that.

After getting the controls sorted out, I waited for slope weather.

And while we are waiting for slope weather, this might be a good time to run down the specs for the big wing. Rol didn't include any specs in his lengthy

instruction manual, so these are from my own measurements:

Span -- 100" in three segments: a 30" center segment and two 35" outboard segments.

All of the electronics, battery, and servos are in the center section. Pushrods cross the joint-line between the center section and the wing-tips to run the elevons on the outboard sections. If you are building a KW100 today you might want to consider Harley Michaelis' RDS drivers instead of long, exposed pushrods.

Wing area: about 1000 square inches.

Aspect Ratio 10:1

All up weight as built by Tom Hoopes: 71.8 ounces or $4\frac{1}{2}$ pounds.

Wing loading: 10.33 ounces per square foot. A wing loading calculator at www.silentflight.net says this means the stall speed will be about 16 mph.

The whole thing breaks down and travels in box 36" x 22" x 9".

For comparison purposes, a Maple Leaf Design Icon is 130" in span, has a wing area of 1150 square inches, weighs 69 to 75 ounces and has a wing loading of 9.5 to 9.8 ounces per square foot.

The plane has a single towhook, and I ultimately learned it winch launches with no difficulty, once you learn how. It has a small plywood landing skid near the trailing edge at the wing root, and it turns out this is the part of the plane

most susceptible to damage. The skag is rectangular, about 3 ½" long by 2" high. Tom Hoopes told me he broke it once, and I have busted it twice since then. If I were building a new KW 100, I would taper the leading edge of that skag so that it would still protect the flaps but would not knife into the turf and get broken.

My first outing with the KW100 was to the big slope at Plainfield, Ohio, a long grassy ridge a couple of hundred feet high, the remnant of a reclaimed strip mine operation. The ridge has since been parceled out and sold off to home owners, but back in the late 1990's hang gliders and RC slopers flew there. The slope was open, forgiving, possessed of a generous landing area, and so wide left to right that you could fly even a large sailplane out of sight.

I let Don Harris take the first flight. We checked to make sure the CG was run all the way forward, and I shoved the KW100 off into the wind while Don flew. It was all very smooth and unremarkable. Don didn't try anything radical, just cruised around up and down the slope, doing turns away from the slope, and then into the slope, checking the action of the flaps, and just generally having a fine time. I think it always pays to have someone with a couple of LSF 8 hour

slope flights under their belt try out your beautiful new sloper.

I got in a couple of flights that day, too. The big center section flaps really slow down the big flying wing and allow easy landings. Just before touch-down I raised the flaps again, and the wing flopped into the tall grass nice and easy.

Ohio doesn't have many big open slopes, and sadly the big Klingberg didn't get out of the cardboard storage and travel box very often. The plane was allegedly winch launchable, but for the life of me I couldn't figure out how to hold the thing to launch it. Years passed while the KW languished in its cardboard box.

The internet provided an answer. I saw an article about how to build a foot-pedal release mechanism for bungee or winch launching. Here is a YouTube video of a device similar to the one I built.
<<http://www.youtube.com/watch?v=v5YdxjzOwyA>>

The launcher I built was made out of carefully selected one inch boards from a waterbed frame that I found in the alley out behind the house when some dude moved out of the apartments next door. I padded the rails with some leftover foam water pipe insulation material. I think I have about \$1.50 in the whole thing, the price of the 12" bolt that the long foot

pedal pivots on. The launcher is 60" long, 8" high, 9" wide (except for that big bolt) and sports a handy carrying handle on one side, right at the CG.

There are three spikes: two in the rear to hold the rig from sliding forward, and one in the front to capture the tow ring on top of the chute. There is a big circular hole in the front of the foot pedal. When you stomp on the foot pedal, the forward end comes up and pushes the ring up off the front pin, and off you go. There are only two other essential pieces of equipment to make the launcher work:

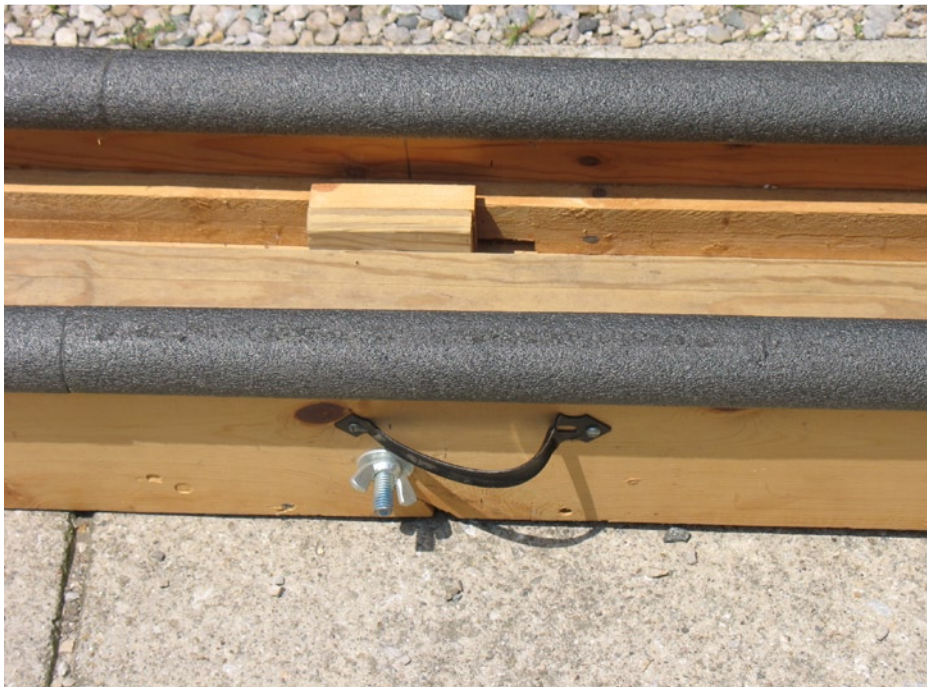
A short tow line extension, looped onto the ring on top of the chute. This runs to back to the tow hook under the plane.

A trusted companion to run the winch for you.

At first I experimented using a high start, and using the foot pedal launcher to launch my trusty Mongo Jr. My Mongo is set up to fly thermal and has a single tow hook just forward of the CG. The foot release mechanism worked beautifully on the Mongo Jr. But there is no off-switch on a high start, and the big KW just looked sooooo beautiful that I couldn't make myself risk it to the bungee.

More years passed. The KW sat patiently in its cardboard box.

Once a scrounged bed frame, now a Klingberg Wing 100 foot-pedal release mechanism.





Launch! Tension the line, stomp on the launch mechanism, and it's off!
You can already see the 'wing rotating into a climb.

Finally, last fall I recruited good friend Bill Hoelcher to run the winch for me, and I hauled the KW and foot pedal launcher out the club's new flying field. Late in the day we gave it a try. We lined up directly into the wind and checked throws for the control surfaces. The CG control was full forward. Bill tensioned up the club's second-line winch (The Wimpy Winch of the West as we call it). At Bill's command,

I hit the foot pedal and the KW100 zoomed off the launch rails.

That first launch was smooth, fast and low. Bill and I have since learned how to launch a bit higher, but even at its best the KW100 does not do the near vertical launches that we are used to seeing from our sailplanes. I flew around the field a couple of times, dropped the flaps and landed. We did a couple of more

launches with similar results. It was too late in the day to find decent thermals, so we called it a day, happy with the first winch launches, only a decade after the KW's purchase.

(I should add here a note about Bill's winch technique. The Wimpy Winch of the West is an old second hand unit, and belt driven. It will launch large sailplanes, but it is not a zoomer. Bill just tensions



Flaps down!

up the line, and then stomps on the winch pedal until the belt slips. Then I hit the foot pedal release; away she goes.

This summer we gave it another try. Our launches were getting successively better, higher with a nice zoom off the end, but still no thermal flights.

On one of the launches, with lots of altitude, we experimented with shifting the CG rearward a bit. Whoa Nelly! At about 25% of the travel on the CG control pot the KW suddenly became unstable and stalled. I did a standard stall recovery while Bill acted as my third hand and dialed the CG back to full forward. I was surprised how sensitive the KW was to CG shifts, especially since it is rock solid throughout the entire range of flap deployment. If you build a 100" KW, be cautious of that CG knob!

On Sunday August 17, 2008, I finally thermaled the big Klingberg Wing.

It was a fine, high pressure summer day, with a light west wind and cumulus clouds building during the afternoon. Thermals had been tight, but powerful, and growing bigger and "poofier" as the day progressed. The club had been flying a Gnome contest and generally fooling around all afternoon. Around 4 pm I finally set up the pedal launcher and got the KW out of its box and ready to fly.

On the first KW launch of the day I could see the big wing marking thermals. I checked out my trims, decided to leave the CG adjusted full forward and made by customary precautionary landing in the soy bean field. On the next launch I dropped the flaps a bit as soon as I hit a thermal bubble, and began a gentle turn. The KW climbed out and became the thermal bird that she had been advertised to be.

If you are going to fly your KW as a thermal bird, all I can say is just follow the directions Rol Klingberg wrote in the manual, but watch out for that aft CG:

"To enter a thermal, simply start a gentle roll while adding in some down elevator. Then roll a little more briskly into the

thermal and then ease in the required up elevator. Once you are in the turn, lower the flap and pull the CG back aft and up you'll go. To achieve the best performance and more stability, in the thermal use about 1/4 flap."

The 110" KW is definitely something different. Well built, it is a beauty to behold. It looks strange and wonderful in the sky. It slopes majestically, and if you can figure out how to winch launch it, will go up the line with no protests. The foot-pedal launch release box is a bulky but effective solution.

What next? I am going to program in some flap pre-sets for thermal flying. And I am going to pull the hatch off, observe the CG movement of the #5 servo, and make some index marks on the CG control knob for future reference. Finally, I am going to find out if my radio will program reverse differential into the channel for the CG shift.

My thanks to our club's "flight surgeon," Dr. Greg Bell, for taking some of the photos used in this article. ■



The **FERengi** *Rules of Soaring*

By Peter Carr, WB3BQO@localnet.com

Many of us have enjoyed the various Star Trek series. The characters, such as Spock and Seven of Nine, hold our interest to this day. Cloaked in all the intriguing gadgets and stunning visuals are some very profound pieces of advise. For example, when Spock departs, he usually says, "live long and prosper". It's hard to argue with advise like that.

And so it was that I found myself at the flying field not long ago. It was the usual contest between my sailplanes and the thermals and I was looking for some guidance. As you can probably attest, the business of staying aloft by remote control cries out for guidance.

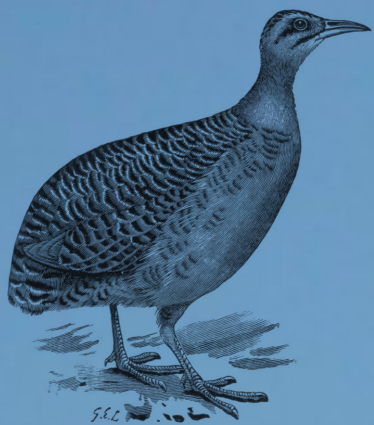
You may have been fascinated by the Ferengi of the Deep Space Nine series. For them "Profit" wasn't a motivation, it was a religion. And, as with all good religions, this one had rules. They are listed on the Internet at http://en.wikipedia.org/wiki/Rules_of_Aquisition. I read through the rules and decided that there must be a hidden message. After looking a little further I found that the author of the Rules was

Ira Steven Behr, the Executive Producer of the series. Rumor has it that Ira was also a sailplane pilot. It seems that Ira was looking for guidance about soaring and developed the Rules while battling turbulence along the eastern edge of the Rockies. It's amazing what you'll do to distract your mind when the air-sick bag is full. Now we know that sailplane people, whether full size or models, have a problem communicating their passion to unbelievers. Ira decided to substitute the words "soaring" and "thermals" for "aquisition" and "profit." This was how he enhanced the TV series while helping his fellow pilots. While there are over 200 Rules, it seems that they were not all written in sequence. Here, paraphrased, are the ones of greatest interest to us.

- * Once you have acquired a thermal.... never give it up.
- * Never allow family to stand in the way of flying.
- * A man is only worth the sum of his sailplanes.
- * Keep you ears open to the thermal-sensor tone.

- * Small details at the pilots briefing lead to big risks.
 - * Opportunity plus instinct equals lift.
 - * Soaring is eternal.
 - * A thermal is a thermal... until a better one comes along.
 - * A thermal pilot without a thermal is no pilot at all.
 - * Thermals are not guaranteed.

 - * Never place friendship above good lift.
 - * A wise man can hear lift in the wind.
 - * Never make fun of a pilots sailplane.
 - * Nothing is more important than your health... except thermaling.
 - * It never hurts to suck up to the Contest Director.
- There you have it, my friends. You now have words to fly by. The next time you watch Star Trek on TV keep in mind that there may be more to the plot than you imagine.
- Live long and thermal. ■



Tindou



Curtis Suter, suterc@msn.com

Tinamous are strictly neotropical birds — not found outside the tropics, and nowhere but in the Americas. They are large-bodied, almost tailless birds with slender necks and small heads, maybe 30% larger than a bobwhite. They fly but prefer to walk or run, and they're secretive.

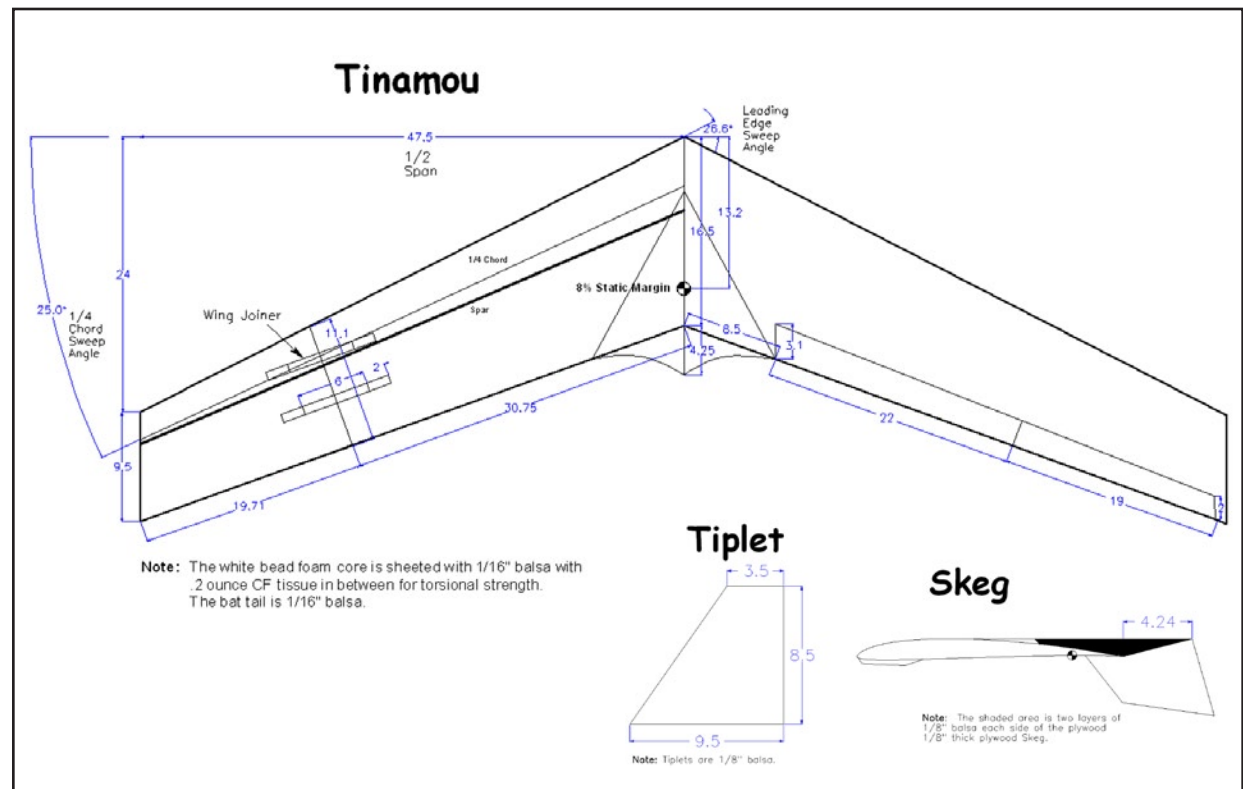
<<http://www.montereybay.com>>

Well, so much for the name. My Tinamou is not secretive, as I have plans free for the asking and it launches, flies and lands very well!

I've always been intrigued by flying wings, especially swept flying wings. Six years ago I happened upon an article about a flying wing built and flown by Herk Stokely. See On The Wing... The Book, Volume 2 #101 - "A Comparison of Two Tailless RC-HLG's." <<http://www.glide.net.au/on-the-wing2/101-Two-HLGs.pdf>>

I wanted a bigger flying wing than Herk's little HLG wing and chose to enlarge his model to 100" wingspan. So I had <<http://www.compufoamcore.com/>> cut the wing cores using white bead foam as I intended to use balsa sheeting for the skin. They did a great job cutting the cores, too!

As all this was taking place I got married, bought a house, and was promoted at work. So best laid plans





I also learned that a flying wing can have flaps, and very effective ones at that!

ended up in the rafters of the garage for five years! The end of 2007 I had some free time on my hands and needed a Montana winter project. So I got the foam cores down from the rafters, emailed Herk and started to think about what I needed to do to complete this project.

Originally I wanted to launch her via electric assist and Herk suggested that I reduce the amount of twist or washout from 8 degrees to 4.5 due to the higher speed of the model.

Well, after five years and just like the weather, I changed my mind about how to launch the model and wanted to use a hi-start and to have a thermal duration model, thus I should have used the original amount of twist. This begged the

question, “How do you determine the proper amount of twist”?

This is when I was led to the late Dr. Panknin, who devised a complex but fairly simple formula with the use of a calculator to determine the required twist. I have since taken his work and made a companion spreadsheet to “Sailplane Calc” called “Flying Wing Calc” that will easily calculate the twist. The spreadsheet is available at <<http://h1.ripway.com/cloudyifr/files.htm>>

THE DESIGN

Herk wanted a nice flying thermal HLG flying wing and he was successful. He chose the SD7037 airfoil for the center section of the wing as this airfoil was proven to have good characteristics. The

SD8020 was chosen for the outer portion of the wing as it's a fully symmetrical airfoil and its sole purpose is to act as the tail of the wing.

A flying wing has a tail just like your typical tailed model; it's just that the tail has a very short moment, i.e. the distance from the wings quarter chord location to the tails quarter chord location. Remember from your basic aerodynamics class that the horizontal tail is used to counteract the negative pitching moment of the main wing by applying a down force, thus pitching the leading edge of the wing up.

The same thing needs to be accomplished with a flying wing. In a swept wing this is done by twisting the

Tinamou Specifications

Span	95"
Chord, root	17", not including bat tail
Airfoil, root	SD7037
Chord, tip	9.5"
Airfoil, tip	SD8020
Sweep angle	25 degrees at 0.25 chord 26.8 degrees at LE
Wing Area	1235 in ²
Twist (washout)	4.5 degrees
CG location	13.2" aft root LE, 8% static margin
Weight	77 ounces
Wing loading	8.98 oz/ft ²
Effective Wing loading	11.67 oz/ft ²

Note: Effective wing loading is 30% greater, as part of the wing is acting as a tail.

outer portion of the wings trailing edge up in relation to the leading edge, thus this applies a down balancing force to the lifting section of the wing.

This is different than with a reflexed airfoil that raises the trailing edge of the airfoil across the entire span, creating a very low negative pitching moment. Very little, if any, twist is required if a reflexed airfoil is used.

Some may ask why not use a reflexed airfoil over the entire span. Well, what I've learned during this process is that a reflexed airfoil will suffer in its thermalling or lifting ability. I believe that reflexed airfoils are suited more to slope soaring, electrics, unswept plank type wings or where higher speed is desired. I was looking for a thermal duration model.

Herk then chose a planform, sweepback angle, taper ratio and aspect ratio for his wing. With all of this information he was able place this information into Dr. Panknin's formulas and determine the required twist angle that was required to be built into the wing. It's important to note that Dr. Panknin's formulas require a linear twist. The first 10" of my wing are pure SD7037 with no transition to the SD8020 as I wanted a good lifting section in the center of the wing.

One of the many things I enjoy about aviation is that I am always learning. During this endeavor I learned about airfoil pitching moments, airfoil zero lift angles, the middle effect, the difference between reflexed and non-reflexed airfoils, and how to determine wing twist to longitudinally balance a flying wing. I also learned that a flying wing can have flaps, and very effective ones at that!

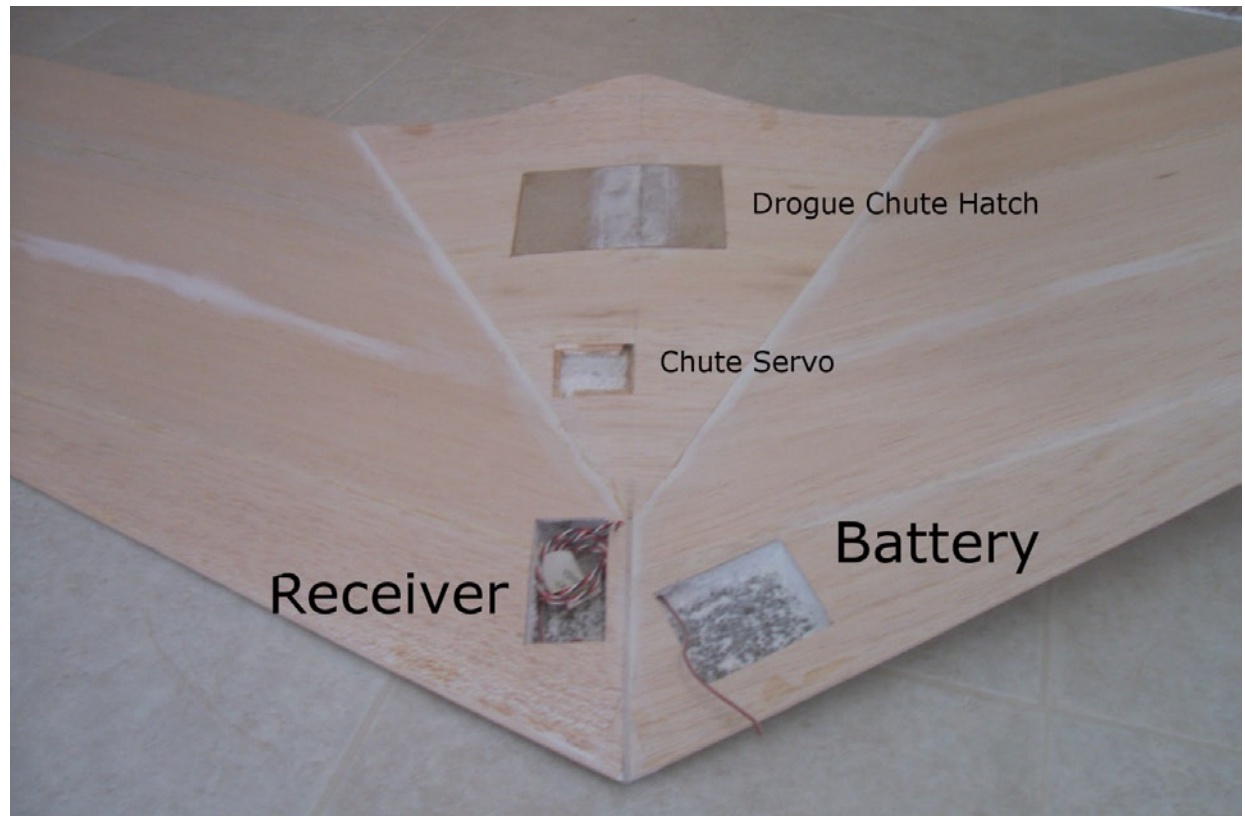
See the table on the left for Tinamou's specifications.

THE BUILD

The basic building of the wing is quite simple. I took the cores that were professionally cut and chose to use 1/16" balsa wood as the skin with 0.2 ounce carbon fiber in between for torsional strength. The spar is .007 carbon tape top and bottom. I used polyurethane Gorilla glue to attach the balsa to the cores via my home made vacuum bag. I can't take credit for this method as it was done by Terry Brox and an excellent review is on his website <<http://www.mackrc.net/patternwings2/index.htm>>.

Proof of how strong his wing is can be found by clicking on "Misc Stuff." I thought this would be plenty strong for what I needed. The entire center section top and bottom is fiberglassed with three layers of .75 ounce cloth starting where the bat tail ends at the trailing edge. Each layer is progressively smaller in span.

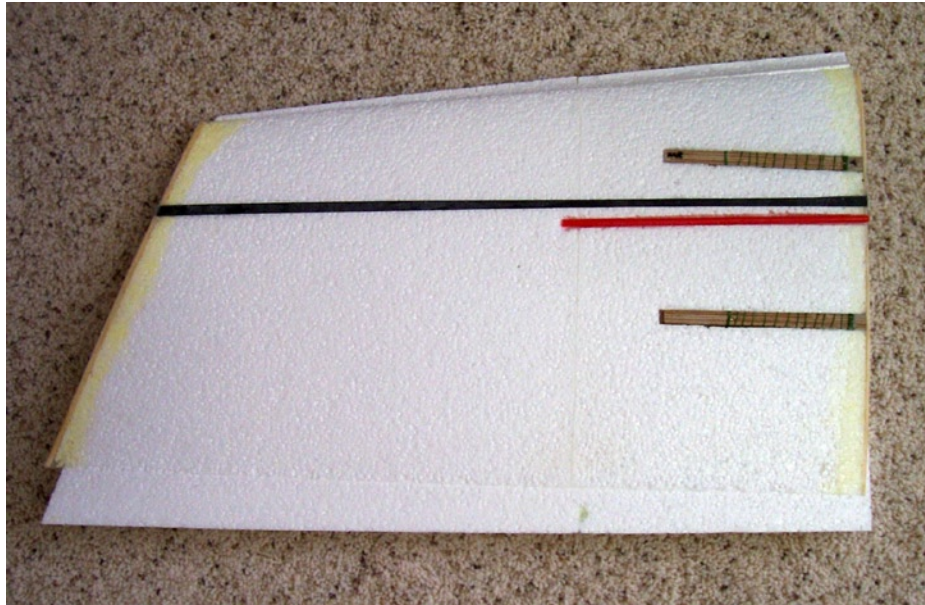
The radio gear is mounted in a very simple manner. The battery and receiver are cut out of the top of the foam near the leading edge. The servos are mounted underneath the wing in pockets cut out of the foam; they are centered on their respective surfaces. I placed hollow pushrod tubes in the wing prior to applying the sheeting so the servo wires were easy to route to the center of the wing. Here you can see



The radio gear is mounted in a very simple manner.



Typical wing joiner. Basswood box, the rectangular carbon rod is six inches long.



The finished tip panel ready for sheeting showing, spar (black line), wing joiners (wrapped wood pieces), and servo wire tube (red).



Vacuum bagging with MityVac hand held brake bleed kit.

where the 'chute servo and drogue 'chute are placed. More on the 'chute later.

I couldn't transport the wing at 100" so I made removable wingtips. I built a basswood box that could receive a rectangular carbon fiber rod and simply tape the panels together prior to flight. It's worked flawlessly.

The carbon rod is six inches long and tapers are cut into the ends of the box to transfer the loads to the wing skins. I chose the length of the outer panel on what I estimated that I needed for elevon

size versus the inner section that would be used for flaps.

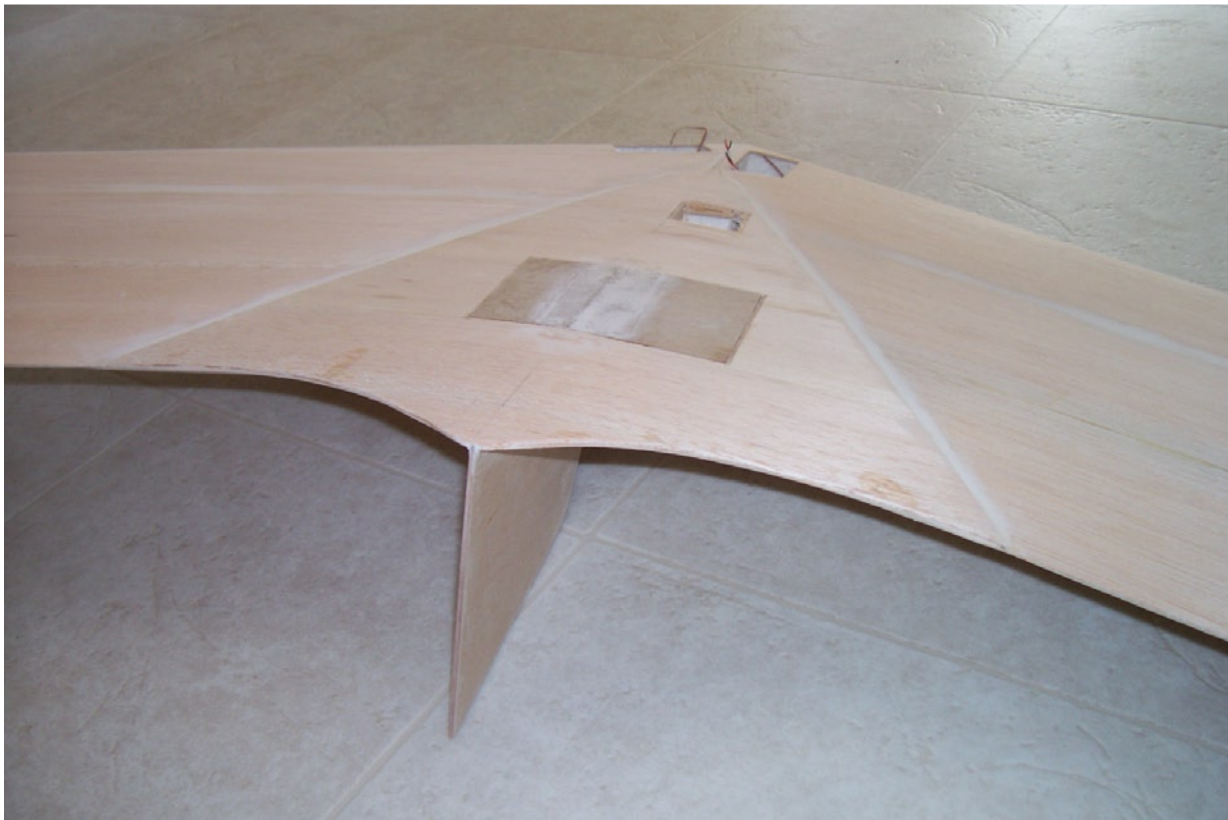
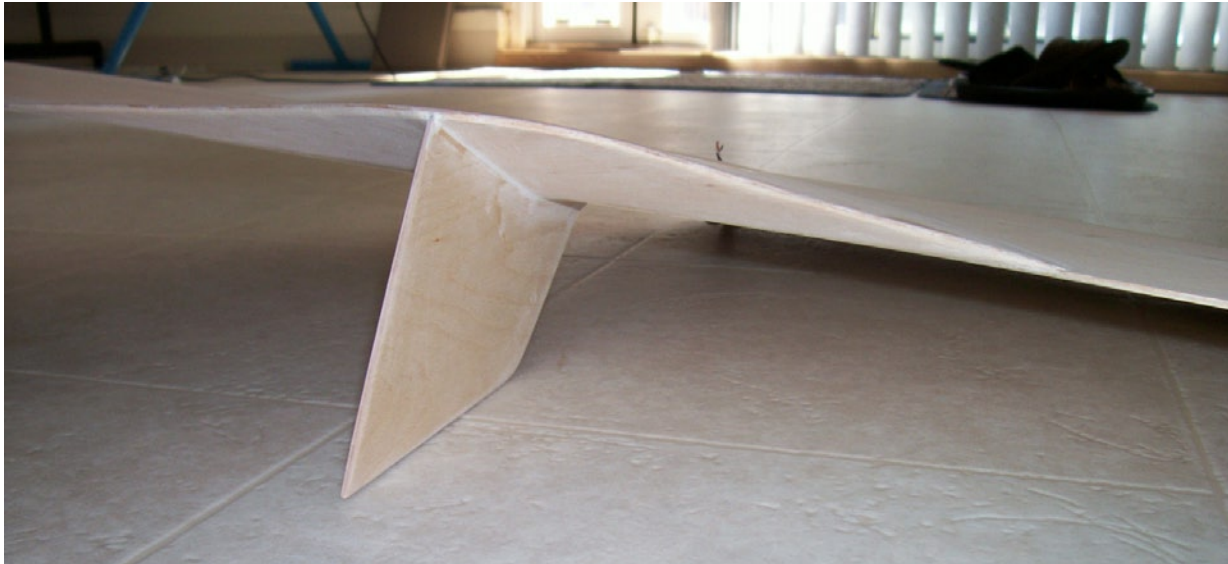
The photo above shows the completed outer tip. I used 1/8" hard balsa ribs at the root and tip. The triplets are 1/8" balsa and fiberglassed to the end of this panel. For sizing I use the TLAR method — That Looks About Right. The black line is .007 carbon fiber tape as a spar and the red tube is for the servo wires. This panel is ready to be sheeted.

The photo above right shows an outer wing panel in the vacuum bag. I used a Space Bag (storage type bag) and a

MityVac hand held brake bleed kit to remove the air. I easily obtained 7lbs per square inch of pressure overnight. However, the Space Bag won't hold much more with this setup. I've used the MityVac system with a different bag and easily held 15 inches overnight.

Herk suggested a skeg in the aft center of the wing to keep the flaps off the ground during landing and something to hold on to during launch. This has also proven to be very effective and simple.

I used a center 1/8" plywood rib to join the wings halves to and the skeg is



cut as one piece with this rib which increases the skegs strength.

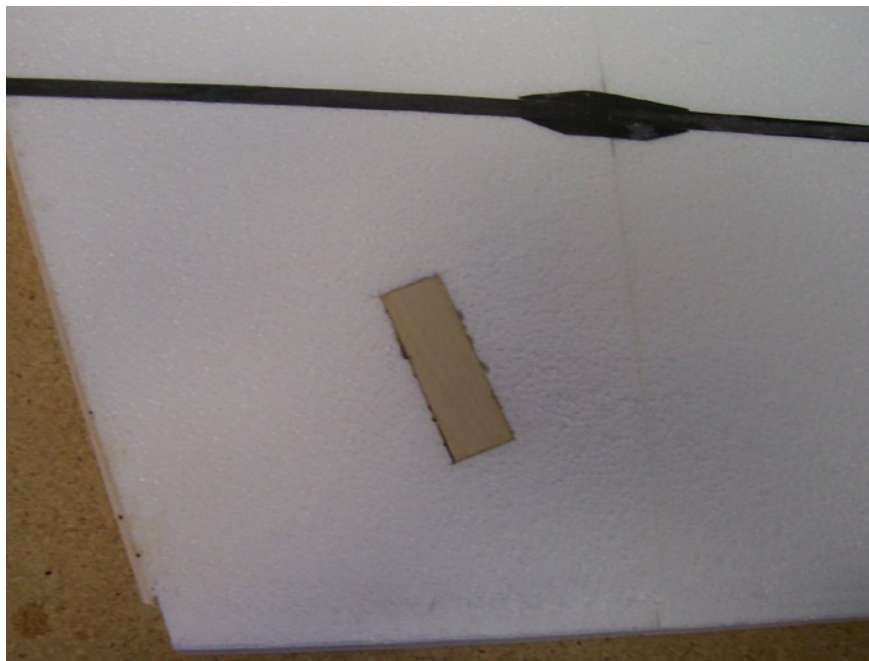
There is an effect called The Middle Effect. In short this effect is the loss of lift at the center of a swept wing due to the detrimental interaction of vortices at the center of the wing. To counteract this, a so called “bat tail” helps in compensating for this loss of lift. The bat tail is shown in the photos on the next page. You can see the raised triangular area built up over the center section, that’s the bat tail.

You may read more about it the effect at On The Wing...The Book, Volume 2 #86, “The Middle Effect” <<http://www.glide.net.au/on-the-wing2/86-Middle-effect.pdf>>

There are two tow hooks placed approximately five inches each side of the center of the root. The left photo on the next page shows the hardwood blocks I inserted in the foam core. The block is full depth so the loads are transferred to the main wing sheeting.

I made a bridle that attaches to the main hi-start chute, it has two rings that attach to the wings hooks and another ring that slides on the harness (string) and this ring is attached to the hi-start parachute.

The skeg and bat tail.



One of the two tow hook blocks installed in the wings. These are full depth so the loads are transferred to the wing skins.



The drogue 'chute and associated servo linkage.

The wings tow hooks are placed 1/2 inch forward of the balance location which is 4% MAC forward of the balance point. This seems too far forward but any further aft and the launch suffered in height and would periodically pop off during launch. The launches have been a non-event, perfectly straight up the hi-start. The initial launch is what concerned me most prior to the first flight but the lack of sleep was unwarranted.

THE 'CHUTE

This hobby is supposed to be fun so I added a drogue 'chute. I saw this on a friend's Graupner SB13 flying wing, so I thought the idea would be great to try on my wing. There was room for a 'chute in the area that made up the bat tail. So I simply made a hatch with a release mechanism. The aft part of the hatch is held in place with two plywood tabs that slip under the top sheeting and the

front of the hatch has a small balsa block glued underneath with a hole drilled in it that accepts a plastic pushrod.

At the end of the 'chute I tied a loop of string and inserted it from left to right through a hole in the center plywood bulkhead and when the pushrod is inserted this holds the 'chute in place. See the photo above right. The pushrod goes through the loop and extends past the hole in the rib into the balsa block



Jeff Vrba launching Tinamou at the Alpine Soaring Adventure Joseph Oregon. Note the wing fences are still in place.

in the hatch, thus holding the hatch in place.

Since the 'chute fits snugly in its compartment when the hatch is closed, it applies a little pressure to the hatch and when released by the servo this allows the front edge to pop up allowing airflow to blow the hatch off the wing. The 'chute is attached to the hatch thus it deploys the 'chute.

The servo has two actuations: 1. During the first half of the movement of the servo the pushrod pulls towards the nose of the wing releasing the hatch, but not far enough to expose the hole cut into the rib, as this would release the 'chute. 2. The second half of the actuation exposes the hole in the rib, releasing the loop of string and allowing the 'chute to be emergency jettisoned.

Also shown in this photo is the root rib and skeg that's cut as the one piece of 1/8" plywood.

The 'chute is somewhat effective but nowhere close to effective as the flaps. The 'chute is big in the "Wow!" factor, though!

Here's a video demonstration of the 'chute: <<http://www.youtube.com/watch?v=6ge4CZnouHg>>.

Curtis! Why did you name this beautiful model, that flies with the grace and beauty of an Albatross, after a shy semi-flightless jungle bird that probably has the same glide ratio as your transmitter?

— Herk Stokely

FLYING

The launches are a non-event and seem to have launch heights similar to my other thermal duration models.

The launches off the hi-start are a little different than my tailed gliders as you don't lean back and give her a hefty throw with forward force. She should be held with one hand by the skeg slightly nose high about waist level and the other hand holding the trailing edge to keep her level. When you're ready to launch you lift her straight up about 12" and let go at the top of the lift, slightly raising the nose during the lift.

Tinamou will go straight up the launch with very little correction required. She doesn't seem to zoom off the launch as well as other thermal duration models. She thermals well, but detecting lift will take a lot of practice as the tail moment is short and it's difficult to see changes in pitch.

There is a bit of yawing during flight and turns but it's negligible.

The stall is quite sharp and will catch you by surprise if you crank too much up elevator in a turn. It takes about 1½ turns for the recovery.

I've tried wing fences and at first I thought there was a significant difference



in handling, but I've since removed them and haven't noticed a significant change with or without them except the stall isn't as abrupt with the fences.

At times I wish I had a little more elevator control in order to crank her tighter around a turn without feeling I may stall her. Finesse is key in flying her, more so than with my other TD ships as a light hand on the elevator is required. This may be solved with moving the balance point further aft and adding the flaps to work as elevators. Thus more flight testing is in order.

The model was balanced at 8% static margin for the first few flights and later moved back to 3% which proved to be too far aft during the low speed high angle of attack landing portion of the flight. She really got overly pitch sensitive during landing.

I've since moved the balance point back to 8% as she launches, soars and lands very well.

The landings are easy. She really slows down well with the large flap area and with more practice spot landings are quite possible. F3J type landings have been obtainable from the first flight, however the USA style of precision landings will take more practice.

CHANGES I'D MAKE IF I WERE TO BUILD ANOTHER

Since the twist was reduced for an electric model I chose to increase the wing sweep from 22.5 degrees to 25 degrees at the quarter chord point which effectively increased the amount of twist. This reduced the overall wingspan to 95". I'm currently flying with approximately 1/8" of reflex to maintain a nice thermal speed.

So if I were to build another Tinamou I'd change the amount of twist from the 4.5 degrees to the 8 degrees Herk originally used. I'd also change where I have the wings joined, making the elevons longer and the flaps shorter, perhaps a 20% increase in elevon span.

I'd probably leave the 'chute out as it took quite a while to get it rigged properly and the flaps are way more effective.

I also would like to try different non-reflexed airfoils, such as the excellent Drela airfoils and perhaps a little bit higher aspect ratio.

But these would be the only changes. I'm so very pleased with how easily she built and how well she flies. Herk Stokely and Dr. Panknin really know what they are doing!

Perhaps in the near future I may make a removable fuselage pod that houses an electric motor in the nose. The pod can be held in place by slipping over the nose then attached to the skeg. It'd be a very simple on/off arrangement.

CREDITS

There are a lot of people I'd like to thank, beginning with Herk Stokely who patiently answered my daily emails for months. Also Jeff Vrba, Jim Cooney, Shawn Keller, Norm Masters and the folks at RCGroups.

Photos and videos courtesy of Jim Cooney, Shawn Keller, Jeff Vrba and myself.

There is a build thread at RCGroups if you're interested. <<http://www.rcgroups.com/forums/showthread.php?t=825810>>

VIDEOS

'Chute video <<http://www.youtube.com/watch?v=6ge4CZnouHg>>

Flight video compilation <<http://www.youtube.com/watch?v=0uMAaJ7c-Xo&url=http://www.rcgroups.com/forums/showthread.php?t=825810&page=9>>

My website: <<http://h1.ripway.com/cloudyifr/index.html>> 



CAMPBELL

Greg Potter, mrgregpotter@hotmail.com

My wife and I are raising a guide dog puppy from the South Australian Royal Society for the Blind (RSB). We got him when he was nine weeks old and now he is nine months old and near fully grown. He is a black Golden Retriever/Labrador cross especially bred for the RSB and his name is Campbell.

I took him to the flying field for a practice session some months ago so he could have a run in the paddock and maybe see some farm animals (usually sheep).

When I walked to retrieve the winch line he would trot along with me and then when I picked up the parachute he would try and grab it from me, so I let him carry it. At that age he was not strong enough to pull the line back against the friction of the winch and the turnaround pulley, so I would take the strain and let him carry the chute.

After about three sessions like this he had grown a bit stronger and was able to pull the line back under his own steam.

Now he does the whole retrieve on his own. When I am about to launch he sits at my feet with his eyes fixed on the parachute. Once I have launched he sits looking towards the turnaround until he sees the chute floating to the ground. Once he has spotted it he heads off at full gallop, grabs the chute and returns it to the winch.

If I am flying with a hi-start he does the same and he is now strong enough to stretch the line back to the point where I launch from.

Frank Slaughter took these photos of Campbell at our recent local club RES competition. ■



