



KNOX COUNTY RADIO CONTROL

May 2021 Newsletter
 Knoxville TN AMA #594
 Editor..Mike Catlin
www.kcrctn.com
 Webmaster..Jeff Prorise

2021 Elected Officers

President - Frank Allemmand - frankallemmand@charter.net
 Vice president - John Basalone - jrbbfarm@yahoo.com
 Secretary - Richard Love - rltlove@1791.com
 Treasurer - Mike Catlin - catlimi2000@gmail.com

Executive Board

Eric Knieper - eric@knieperphoto.com
 Ed Dumas - ed@eddumas.com

Safety Officer

Jim Maines - oersted@aol.com

PRES CORNER



John and I prepared this column together. Everyone on the EC has read and approved it. We want to share how we feel about the club, to thank many of you who expressed your support for us and what we are doing, and lastly, to ask everyone's help in going forward to achieve our vision and goals sooner rather than later.

We believe good decisions must be based on facts and reality. This means utilizing the knowledge of what is going on in the world, not just what a few people in isolation think or have gotten used to.

- When you are an AMA club and do not like an AMA policy, you cannot ignore it and hide. Concerning AMA's FPV policy, we talked with AMA and other club presidents, figured out how to modify certain troubling aspects of the AMA policy, and implemented a compromise that AMA, other clubs, and KCRC all considered acceptable.
- When the FAA makes a rule, you also can't hide from it. Sooner or later they will find out, and the consequences could be severe. Some in our club wanted to ignore the FAA FPV rules, and viewed the risk as minimal. They were wrong. The FAA actually did come knocking on our door, and lucky for us we were in full compliance.
- When three other clubs spent about \$10,000 on a commercial mower, trailer, and storage shed and tried to get their field maintenance work done with club volunteers, they found it did not work. We were wise not to do the same thing. It was a big warning sign. We are really lucky to have John.
- When the AMA insurance people and our legal advisor are telling us and everyone else that there may be big liabilities if we do not deal proactively and thoroughly with safety issues, it is time to pay attention. We did that.
- When you see dangerous situations at the field and people are almost getting hurt or killed, it is obvious to fix them before it is too late. We also did that too.
- When you see massive construction everywhere around the field, and with our previous mentor at the Parks Dept retired, everyone should realize there may be lots of people demanding soccer fields or some other use of our land. We have to be a leader in Knox County, and want to show everyone how much good the club is doing.

Our goal and vision is to make KCRC into a great RC club that is well known in Knox County for its professionalism and service. We want to be like the Chattanooga club, the Johnson City club, and the Coffee Airfoilers club (in Tullahoma). All are well known and respected in their areas. This means we have to aggressively pursue service oriented programs like the flight training camp. It also means we need a reputation of being especially friendly and flawlessly safe. And it means we have to get a lot more members.

Of course these goals will take some time. Even though we believe we are doing well and making good progress, the help and support of all members would be appreciated and is very important to our success.

- The Safety Policy implementation, which is very far along, has to be finished. Everyone must not only buy into the safety policies needed to stop dangerous situations, but promote it aggressively among our members and with our visitors. Criticism of good safety practices is the first step of becoming an unsafe club.
- We must have a courteous and friendly environment at the field. We are finally starting to consistently see it. Members with strong opinions or tempers must save their ideas for a different time. It is a free country, but not so free that you can say or do whatever you want, whenever you want to. At a gun range or at a golf course, some people are not tolerated. They are asked to leave or worse. We intend to do likewise if we have to. For safety reasons, everyone must be able to effectively communicate with each other. No member should ever feel so intimidated that they are afraid to approach another member with a safety question, or be scared to ask for sole use of the field for a maiden or other special flight situation. And of course, we want a safe and courteous field to enjoy our hobby and to impress our visitors.
- We must also have a courteous and friendly environment at meetings. In the past we have

seen some members get upset and temperamental, call others nasty names, make unsubstantiated accusations, and even engage in premeditated plans to be purposely disruptive. Several KCRC members noted that that a few individuals at a recent Knox County Commission meeting were behaving similar to a few of our members. The big difference was they were immediately arrested, removed from the meeting, and charged with a misdemeanor. Our meetings must be friendly and productive so that all our members can participate in key decisions affecting the running of and the future of the club. It would be great if everyone strongly and unanimously supports this, and we don't have to fall back on Roberts Rules. We usually have an awful lot to cover at meetings; we absolutely have to be courteous and very efficient to get it all done.

- So how do people with strong opinions get their ideas and their disagreements considered? If they cannot advocate for them at the field, and are not given much time at meetings, what should they do? A first recommendation is to email the President and possibly even the whole EC and explain what is on your mind. Our goal is to quickly respond to every email, and we take pride in doing so. Quite honestly, however, we often get redundant emails from some individuals who totally ignore our answers, ignore EC decisions, and even ignore club votes. So at some point certain email exchanges become kind of meaningless. Our goal now is to respond to all "reasonable email," and to simply ask others to schedule an appointment with the EC.
- The EC has agreed that we can make time at our meetings for any KCRC member wishing an appointment regarding any issue they want to discuss. The member should email their request for an appointment, and give us an idea of the subject so we can be prepared. We will email back the specifics of when a meeting is scheduled, what time we would like you to come, and how much time you will be given. We will only let a person do one issue at a time. The member should present their view,

and should be prepared to elaborate if EC members have questions. The member will then be asked to leave, and the EC will review, analyze, and take whatever actions are needed.

- Another idea for anyone with strong opinions is to consider running for office. John and I and the EC all welcome those that want to assume club responsibilities. We would also love to hear any better ideas others might have for the future of the club. One example of a very different approach is that some older KCRC members think the soccer moms are invincible, and that it is a waste of time to become a leadership club to try to protect our land or to try to get help with a new runway. They just want to keep having fun while the field lasts. It will be interesting to see how the membership views this kind of a future plan if someone runs for office promoting it.
- Unfortunately there are always situations in all organizations where a few people can do bad deeds that ruin things for everyone. In those cases, the bylaws require that discipline be used as a last resort for correcting serious and improper recurring behavior. Each of the three well known clubs mentioned has been forced to use discipline as part of achieving their excellent safety programs. Regarding unacceptable behavior at meetings and at the field, our attorney has reviewed a lot of KCRC's documents, and says the kind of disruptive and sometimes retaliatory behavior we have been putting up with for a year is unacceptable under our bylaws and is very unacceptable compared to other nonprofits. None of us on the EC like using tough enforcement or discipline measures, but in the end we have to do what is necessary to achieve the club's most basic two objectives, a safe and friendly environment.

So in summary, John and I and the whole EC would like all members to be friendly and courteous, have a good time flying, and be safe. We think we are finally "over the hill" in terms of clearly seeing a smooth path forward. We again

want to thank all of the many members who have expressed their help and support for what the EC is doing. And we hope future newsletters can focus entirely on the exciting positive things we hope to achieve.

Frank and John (and Unanimous Approval by the EC)

PS Don't forget our upcoming events. We will have a picnic on Saturday, May 29, and another picnic and Cub Fest on Saturday, July 3. The SPA event is Saturday and Sunday, May 22 and 23. And our next meeting will be on June 8 at the field.

KCRC MEETING MINUTES:
APRIL 13, 2021

Attendees:

Officers:

PresidentFrank Allemand
Vice President... ..John Baselone
Secretary.....Richard Love
Treasurer..... ..Mike Catlin

Executive Committee Members:

Phil Spelt
Ed Dumas
Eric Knieper

Safety Officer:

Jim Maines

President Allemand called the meeting to order at 6:05 PM.

Location: Park West Church, 7635 Middlebrook Pike with CDC mask and spacing recommendations observed.

- **Introduction of any new members or visitors**

There were 21 total in attendance including officers, members and one new member (Michael Glasman).

- **Approval of Prior Minutes**

Minutes of the last meeting held October 17, 2020 were approved without objection.

- **Update and EC Perspectives**

President Allemand took some time to inform the members of what he and the Executive Committee have been trying to do and the resistance of a few causing an impediment to our progress.

Our goal is to have a friendly and safe club. With the current housing construction craze in progress in the county, it is felt that we could lose the field to an alternate use. Therefore, keeping the field is another goal.

To accomplish these goals, the current membership has voted in a previous meeting to proceed with the Youth Flight Camp to help increase membership (especially young people) and visibility of KCRC in an effort to increase our chances of not losing the field. The club has already approved bylaws and recommendations for safety and regulatory “must do’s” from AMA and FAA. These cannot be ignored.

Even though approved, there are still a few members engaged in an argumentative tone on points that have already been resolved. Also, the president and the EC have been subjected to severe criticism. This only serves as a distraction and takes time and energy away from important issues like the Youth Flight Camp planning and administration.

So, the EC would like your help and cooperation to:

- Increase visibility – Show worth to the community to keep from losing the field to an alternative use
- Grow club membership – especially with young members from programs like Youth Flight Camp
- Maintain Safety – to prevent an episode causing loss of the field and protect the EC members from personal liability

President Allemand cited other clubs in East Tennessee (Chattanooga, Johnson City, and Coffee Airfoilers) that are good examples of doing the above.

- **Treasury Report and 2021 Budget**

| | |
|------------------------|----------|
| Beginning Balance..... | \$13,340 |
| Dues..... | \$3,347 |
| Subtotal..... | \$16,687 |

Less expenses.....\$2,559

Ending balance..... \$14,228

Expenses include electricity, Port-a-Potty, field maintenance, runway maintenance, signage, etc.

The 2021 budget is as follows:

| | |
|-------------------------------------|---------|
| Income..... | \$9,200 |
| Dues (\$75 x 84 members)... | \$6,300 |
| Estimated for Flight Training Camp. | \$2,900 |

| | |
|---|---------|
| Expenses..... | \$7,165 |
| Fixed (Park fee, AMA, Potty,etc)..... | \$3,115 |
| Variable (field & runway maint, picnics, event prep)... | \$4,050 |

Net Result..... \$2,035

Bill Dodge made a motion that the budget be approved and was seconded by Phil Spelt.

The budget was approved by a large majority.

- **Flight Training Camp**

Barton Smith is the coordinator for the camp along with Phil Spelt and Ed Dumas.

He gave an overview of the camp program that will be held from Monday June 14 to Friday June 18.

The first 3 days will be held at Pellissippi State from 9 AM until noon.

Monday will be ground school.
Tuesday will be working with flight simulators and an AMA Alpha Trainer purchased from AMA (students will keep).

Wednesday will also be for simulators plus a Beta Trainer (purchased from AMA and for students to keep).

Thursday and Friday will be held at the field from 9 AM until 2 PM. Students will fly buddy-boxed to a KCRC instructor using a KCRC trainer airplane. Each student will get 3 5-minute flights.

Sign-up sheets are available for volunteers that desire to help during the week. You may choose the day(s) and the activity you want to help.

- **Field Report and Upcoming Projects**

Projects include:

Front entrance bushes and trees cut

Possible new sign at entrance

Grandstand moved closer pavilion, covered, and netting installed to provide protection

Repair wood benches

Power wash walkway

Paint dilapidated wood on the stands and pavilion

- **Actions Required to Move KCRC Ahead**

- 1. ADDRESSING SAFETY POLICY**

We have to do it!

If you have an objection, bring it to the EC (and we encourage you to bring a solution or an alternative for our consideration)

The EC will keep meetings private as long as you do.

- **ADDRESSING CRITICISM AND UNACCEPTABLE BEHAVIOR**

No repetitive rehashing of issues already resolved and agreed to.

No meeting interruptions. Meetings must follow Roberts Rules of Order.

No rudeness at the field. This will embarrass us in front of visitors, new members, and possibly county officials and the press. Our internal bickering has already leaked to outsiders and potentially resulted in a significant loss of a donation to the club.

- 3. MANAGEMENT OF VISITORS**

- a. Review of unescorted visitors**

Signs will be available instructing where a visitor must go to be in a safe area.

It is recommended that a visitor be acknowledged/welcome in a short

period (one other club says 30 seconds)

Phil Spelt is working on a visual and audible signaling system for a guest with a question.

b. Need to meet and respond to visitors

We want to make our guests (possible new members) feel welcome.

c. Treatment of escorted visitors

If you are escorting a guest, it is your responsibility for their safety.

Eric Knieper made a motion that we adopt a positive attitude to accomplish the above and move the club ahead. All voted yes.

• **Overall Go Forward Vote**

Frank asked all members whether they supported going forward with the whole EC proposal of safety policy, eliminating unacceptable field behavior, minimizing criticism, having safe areas for visitors and taking special care to respond to their requests, and using discipline if and when needed. All in favor were asked to vote YES by standing. The vote was unanimous, everyone stood.

• **Model of the Month**

No entries.

• **Crash of the Month**

No official entries.

• **New Business**

Michael Glasman requested that a tutorial on AMA insurance be presented at the next meeting.

Phil Spelt announced that the SPA pattern contest is scheduled for May 22 and 23. Jimmy Russell is the coordinator.

Meeting adjourned at 7:52 PM.

Next meeting scheduled for June 8, 2021.

SAFETY AND THE TREATMENT OF VISITORS

Eventually we hope to implement a plan to create three separate safe visitor areas away from the flight line shed and the safety fence. KCRC members would then at their discretion invite visitors to the flight line stands or to watch flying at the safety fence. However, this implementation will take some time to complete.

For now we will continue to allow visitors to walk around the field in areas south of the flight line structure, which means observing the NO VISITOR BEYOND THIS POINT signs. Visitors may also continue to sit in the chairs along the back of the flight line structure, but they should never be north of the signs unless invited by a member.

When visitors are near the flight stands, please observe the following precautions

- Visitors should never be close to any flight stands with a running engine.
- Visitors should not be allowed to sit in chairs anywhere close to being in front of a running engine.
- Visitors should never be allowed to stand along the flight line fence to watch planes fly unless invited to stand there by a member.

Please be friendly to all visitors. Tell them all about our club and our hobby. Greet them promptly when they arrive on our site.

If they appear interested in joining our club, please give them an application. Blank application forms are in the Info Box hanging in the pavilion.

Please also remember: if you invite a visitor to go beyond the normal visitor allowed areas, or are just speaking with them when they do, the club and the AMA are going to see that as you deciding to take responsibility for them. So please pay attention, watch visitors carefully, and be sure they stay safe.

Frank and Michael

Videos To Blow You Away

Wind Tunnel 1955

https://www.youtube.com/watch?v=woL6RJNL2e0&t=17s&ab_channel=BritishPath%20C3%A9

The History of a Wind Tunnel

https://www.youtube.com/watch?v=WNZbPOqmR9I&ab_channel=NASAGlennResearchandTechnology

Wind Tunnel Test Of Vickers Bac 1-11 Aircraft 1961

https://www.youtube.com/watch?v=-zTFhCQzEGM&ab_channel=BritishPath%20C3%A9

NASA Tests Boeing Aircraft Tail in World's Largest Wind Tunnel

https://www.youtube.com/watch?v=4PabZAx-4Yw&ab_channel=NASA%20AmesResearchCenter

How Wind tunnels Work – Contraction Test Section Diffuser Fan Turning Vanes and Settling Chamber

https://www.youtube.com/watch?v=L1AYo9Mk1EI&ab_channel=AirShaper

Lipo Battery Fire Stories And Prevention Tips from Kevin Turner

https://www.youtube.com/watch?v=7niXzg80A0o&ab_channel=KevinTurner

Rocket Trivia by Michael Catlin



Mike Collins one of the Apollo astronauts died this week which is the inspiration for this piece.

Lets learn about mechanics, of the orbital kind. I'm sure we have all seen the liftoff of a Saturn 5 rocket and Space-X's Falcon rocket but did you notice the difference? The Saturn 5 had fins while the Falcon does not. You might be thinking that the fins guide the rocket at the start of flight but the engines balance the rockets



throughout their flight. Model rockets are guided at launch by a launch wire until their fins are aerodynamically effective but nothing is guiding the mighty Saturn 5 except the gimbaling of the engines. So why the fins with their weight, if they are not effective?

Let me interject a little explanation here, the fins on a model rocket serve to move the aerodynamic center behind the center of gravity. The aerodynamic center being the location where all the forces are balanced. The center of gravity is where the mass forces are balanced. If the aerodynamic center is ahead of the center of gravity then the rocket is unstable and will try to “flip” the set things right. But, back to the Saturn 5’s fins.

The first stage of the Saturn 5 (S-1C) has 5 F-1 engines and they weigh about 20,000 pounds so there is 100,000 pounds of weight at the “wrong” end of the stage when the S-1C was jettisoned or



staged. The weight of the S-1C was 290,000 pounds and it was 138 feet long. Since the weight of the stage was only 190,000 pounds and it was 138 feet long the aerodynamic center was very much in front of the center of gravity so the stage would flip around and could possibly strike the second stage before it had time to ignite. The fins were added to prevent this from happening or to slow the flipping enough to allow the remaining rocket to pull away.

Another point about launching a rocket into space is that launching straight up will not put the rocket into orbit. To reach orbit the rocket needs to reach the right velocity parallel to the earth’s surface. The first part of the flight is vertical to get out of the thickest part of the atmosphere as quickly as possible. Which brings up “Max-Q”. What is meant by Max-Q? “Q” is the symbol used in aerodynamics to denote the force of moving fluids and has the equation with the symbol ρ indicating the density of the fluid (air) and V as the velocity. As the rocket ascends ρ decreases

$$P_{Dynamic} = \frac{1}{2} \rho V^2$$

while V (velocity) increases. At one point the curves cross and this is the point of maximum dynamic pressure. When launching a rocket the winds aloft are carefully watched so as not to have

a large crosswind around the altitude of Max-Q as this may cause the rocket to structurally fail (blow up). Above Max-Q the rocket’s path begins to bend over to reach a path parallel to the surface as orbital velocity is reached. If done perfectly, the orbit is circular.

What if the speed is off? If the speed is too high the rocket will gain height until it is halfway around the globe and then begins to drop until it reaches the altitude of orbital insertion. This creates an elliptical orbit. If the speed is too low the rocket will descend until halfway around the globe and then ascend until it reaches the insertion point altitude. If the orbit descends too low, the rocket will intersect the surface of the earth and this is what is called a ballistic missile.

Why is it hard to rendezvous with another spacecraft? In the above paragraph I described what happens to the altitude when the speed is off. Too fast and the altitude increases, too slow and the altitude decreases. If the spacecraft one is trying to rendezvous with is 20 miles away and you thrust towards it, you will have raised your orbital velocity and caused your orbit to rise as you circle the earth. This extra height makes you craft travel a longer distance and you will fall behind the spacecraft you are trying to catch. If you want to catch the other spacecraft you need to slow down so your spacecraft drops to a lower (and faster) orbit and thus catching the other spacecraft one orbit later. This is why taking astronauts to the space station can take 24 hours or more.

Youth Flight Training Camp

The Youth Flight Training Camp has been postponed until summer 2022 due to the uncertainty around Covid-19 and the lead time to make all necessary arrangements.

Membership

If you need more than one sticker simply ask. Since we are now getting Drone members, be on

the lookout for Drone stickers which have a drone image on a blue background.

After February there is a \$5 penalty (\$89). I am accepting mail in renewals. Send checks to (no cash please)

KCRC c/o Michael Catlin
6812 Adrian Rd
Knoxville, TN 37918

The gate combination has been emailed to current members only and only current members will receive email notices and newsletters. Newsletters will still be posted on the clubs website <http://www.kcrctn.com>. However, this may change in the future and only newsletters from previous years will be available to non-members.



Remember, only those with current AMA membership will be allowed to fly at the field and do not tell anyone the gate combination without checking for membership. If there is a question about membership, there is a membership roster in the lock box with the applications. Non-members do not receive email notifications about club events or newsletters.

Don't forget to visit KCRC Knox County Radio Control on Facebook!

331 members strong.
Daily 10 day weather predictions
Daily aviation photos
Event advertisement from other area clubs
Items for sale. Articles, information and aviation related videos.
<https://www.facebook.com/groups/817242841697766/>

Hobbytown

Let's not forget Hobbytown here in Knoxville. Over the last year Gary at Hobbytown has been a great supporter of KCRC and his donations are much appreciated.

<https://www.hobbytown.com/knoxville-tn/1134>



Yes, that's me, Michael Catlin, circa 1977. World Engines 27MHz transmitter, aviator sunglasses, 100 pounds lighter and much more hair! Beach flying at it's best!



If you have an “antique” photo of yourself send it to me to be included in the newsletter.



SPA Ben Oliver Memorial Pattern Classic

**May 22 & 23, 2021
Knoxville, Tennessee
AMA sanction # 9925**



SPA is dedicated to the building, flying, and competition of vintage pattern models for ALL ages. Come out and experience the FUN of an old school one maneuver per pass Pattern Contest. Relaxed date rule in novice, any sport aerobatic plane allowed. Retracts now allowed in all classes!

Registration @ 8:00am, Saturday
Pilot Meeting @ 8:45 am
Field open for practice Friday afternoon.
Camping onsite, no hookups
Covered pit area with 110VAC
CD: Jimmy Russell (606) 260-2258
jameslelandrussell@gmail.com

Classes to be flown:

Basic, Sportsman, Advanced,
Expert & Senior Expert

See: seniorpattern.com for info

Entry fee: \$25.00

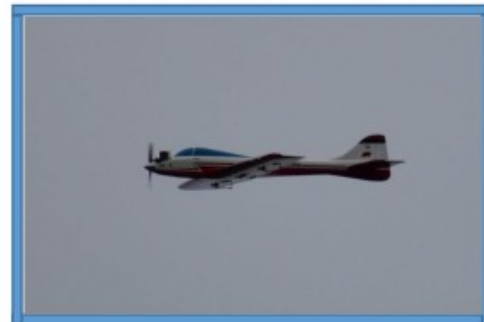
Saturday Lunch: \$5.00

Drinks provided for pilots
and pit crew both days.

Raffle Prizes From Sponsors Shown

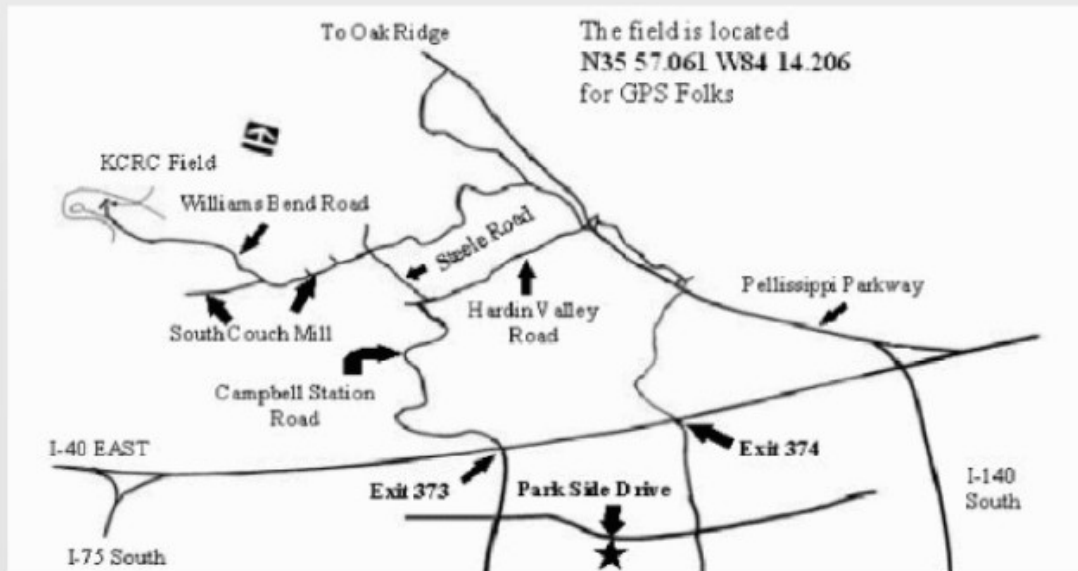


SPA-Register



Performance Model Aviation





KCRC Field: 3204 Williams Bend Rd Knoxville TN 37932
 GPS: N 35° 56' 53", W 84° 13' 58"

From Pellissippi Parkway (Hwy. 162)

Take the Hardin Valley Road exit off of Pellissippi Parkway/Highway 162 and drive west on Hardin Valley Road. After approx. 2.5 miles, turn right on Steele Road (just past Hardin Valley Elementary School). Drive approx. 1 mile and turn left on Sam Lee Road.

Sam Lee Road turns into Couch Mill Road, and about 1 mile after you turn onto Sam Lee, Couch Mill Road turns sharply to the left. Go **straight** at the turn. You're now on Williams Bend Road, and after about 2 miles, you'll see the entrance to KCRC on your right (directly across from the water treatment plant on the left).

Getting to Pellissippi Parkway

From Oak Ridge, take Highway 62 through Solway and merge onto Pellissippi Parkway. From Knoxville, take I-40 West/I-75 South and exit north onto Pellissippi Parkway towards Oak Ridge at exit 376.

Link to map: <http://www.kcrctn.com/Directions.aspx>

Comfort Suites 811 N Campbell Station Rd Knoxville TN (865) 675-7585

Hampton Inn and Suites Knoxville -Turkey Creek/Farragut,11340 Campbell Lakes Dr Knoxville TN 37934 (865) 966-0303

Holiday Inn Express & Suites Knoxville-Farragut 816 N Campbell Station Rd Knoxville TN 37932 (865) 966-2500

Country Inn & Suites 805 N Campbell Station Rd, Knxville TN 37932 (865) 675-9800

| SPA Basic 2021-2022 | | K |
|---|--|-----------|
| 1. Takeoff (U) | | 1 |
| | <i>(Downwind Trim Pass)</i> | |
| 2. Straight Flight Out (U) | | 1 |
| 3. Procedure Turn | | 2 |
| 4. Straight Flight Back (D) | | 1 |
| 5. Stall Turn (U) | | 2 |
| 6. Immelmann Turn (U) | | 2 |
| 7. 2 Inside Loops (U) | | 2 |
| 8. 2 Horizontal Rolls (D) | | 2 |
| 9. Reverse Cuban 8 (U) | | 2 |
| 10. Straight Inverted Flight (D) | | 2 |
| | <i>(Fly By For Landng - 2 Allowed)</i> | |
| 11. Landing Perfection (U) | | 1 |
| Total K Factor | | 18 |
| Notes: | | |
| <ul style="list-style-type: none"> • No EXTRA Fly-bys allowed • Maneuvers flown out of sequence will be scored ZERO (0) | | |

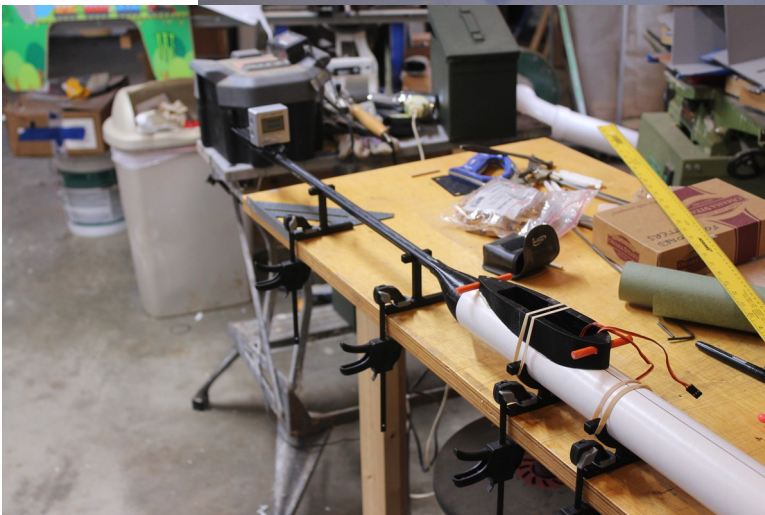
| SPA Sportsman 2021-2022 | | K |
|---|-----------------------------|-----------|
| 1. Takeoff (U) | | 1 |
| | <i>(Downwind Trim Pass)</i> | |
| 2. Double Stall Turn (U) | | 3 |
| 3. Cuban 8 (D) | | 2 |
| 4. Double Immelmann (U) | | 2 |
| 5. 2 Point Roll (D) | | 2 |
| 6. 3 Inside Loops (U) | | 2 |
| 7. Slow Roll (D) | | 3 |
| 8. 1 Reverse Outside Loop (U) | | 2 |
| 9. 3 Horizontal Rolls (D) | | 3 |
| 10. 180 Degree Turn (U) | | 3 |
| 11. 3 Turn Spin (U) | | 2 |
| | <i>(Fly By For Landing)</i> | |
| 12. Landing Perfection (U) | | 1 |
| Total K Factor | | 26 |
| Notes: | | |
| <ul style="list-style-type: none"> • No EXTRA Fly-bys allowed • Maneuvers flown out of sequence will be scored ZERO (0) | | |

| SPA Advanced 2021-2022 | | K |
|---|-----------------------------|-----------|
| 1. Takeoff (U) | | 1 |
| | <i>(Downwind Trim Pass)</i> | |
| 2. Figure M (U) | | 3 |
| 3. Cuban 8 (D) | | 2 |
| 4. Reverse Double Immelmann (U) | | 2 |
| 5. 3 Horizontal Rolls (D) | | 3 |
| 6. 3 Reverse Outside Loops (U) | | 3 |
| 7. Slow Roll (D) | | 3 |
| 8. Square Loop (U) | | 3 |
| 9. 4 Point Roll (D) | | 4 |
| 10. Top Hat (U) | | 3 |
| 11. Knife Edge Flight (D) | | 3 |
| 12. Vertical Roll (U) | | 3 |
| | <i>(Fly By For Landing)</i> | |
| 13. Landing Perfection (U) | | 1 |
| Total K Factor | | 34 |
| Notes: | | |
| <ul style="list-style-type: none"> • No EXTRA Fly-bys allowed • Maneuvers flown out of sequence will be scored ZERO (0) | | |

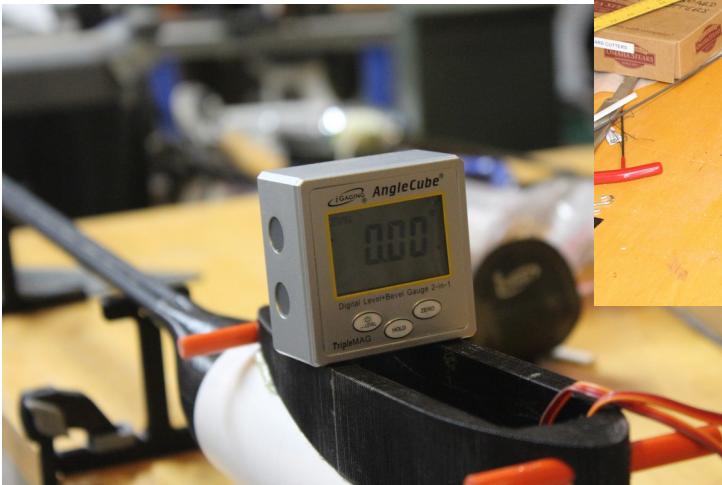
| SPA Expert/Senior Expert 2021-2022 | | K |
|---|-----------------------------|-----------|
| <i>Use for Expert and Senior Expert</i> | | |
| 1. Takeoff (U) | | 1 |
| | <i>(Downwind Trim Pass)</i> | |
| 2. Figure M with ¼ Rolls (U) | | 5 |
| 3. 2 Rolls Opposite Directions (D) | | 3 |
| 4. Inverted Reverse Cuban 8 (U) | | 3 |
| 5. Slow Roll (D) | | 3 |
| 6. 3 Reverse Outside Loops (U) | | 3 |
| 7. Reverse Knife Edge (D) | | 4 |
| 8. Square Horizontal 8 (U) | | 4 |
| 9. 8 Point Roll (D) | | 4 |
| 10. Avalanche (U) | | 3 |
| 11. Triangle Rolling Loop (D) | | 4 |
| 12. Inverted 3 Turn Spin (U) | | 3 |
| | <i>(Fly By for Landing)</i> | |
| 13. Landing Perfection (U) | | 1 |
| Total K Factor | | 41 |
| Notes: | | |
| <ul style="list-style-type: none"> • No EXTRA Fly-bys allowed • Maneuvers flown out of sequence will be scored ZERO (0) | | |



How do you store your planes?



Assembling the "Rocket Glider" with 3D printed tooling



Great tool for rigging!



The (Tail) End