...

PRESIDENT
Greg McNutt
541-306-0633
gregmcnut@aol.com

VICE PRESIDENT
Waldemar Frank
541-330-8165
rcbonanza@gmail.com

SECRETARTY/TREASURER
Tom Rainwater
858-527-8627
trainwater157@gmail.com

SAFETY OFFICER
Bob Ingram
541-480-0855
bob.ingram.bend@gmail.com

FLIGHT INSTRUCTORS
Bruce Burgess
541-279-1486
Rick Burgess
541-504-5999
James Fredericks
541-350-5564
Greg McNutt
541-306-0633
Mike Wissing
541-491-7352

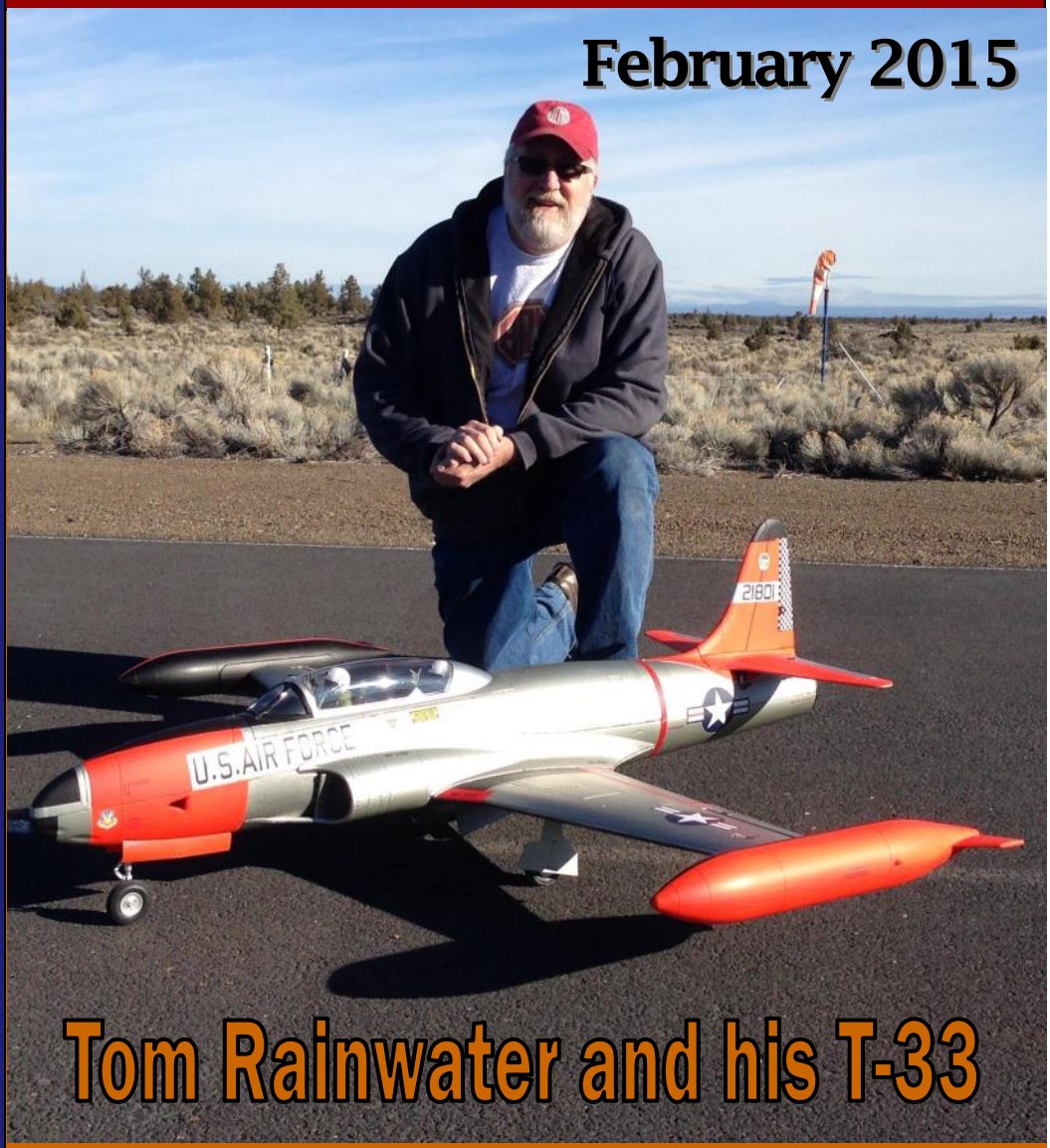
AMA District XI VP
Chuck Bower
360-632-9211

FLIGHT REPORT EDITORS
Greg McNutt
541-306-0633
Waldemar Frank
541-330-8165

Bend Aero Modelers

Flight Report

February 2015



Tom Rainwater and his T-33

Next Meeting

February 25, 2015
6:30pm at Black Bear Diner
Food available
Come early to visit and eat!

FROM THE PRESIDENT

Message from the President

Dear Members & Interested Readers:

Even though we have over 30 days of winter remaining, it sure hasn't felt like winter here in Central Oregon. With temperatures in the 50's and 60's and winds often in the 5 mph range, our flying conditions and opportunities have been awesome, to say the least. As the Midwest and Eastern U.S. have experienced record snow storms, we have enjoyed several "warm" days of flying at Popp's Field in January and February. It looks like the calm weather will continue for awhile, so plan to get out and fly when the opportunity presents itself.

I would like to welcome all of the new members who have joined our club in January and February. Many of our new members are new to R/C flying and are taking advantage of the flight instruction that we offer here at Bend Aero Modelers. It has been exciting to watch these new folks take to the skies under the guidance of our flight instructors. Some of our new members have already taken their solo flights, while others are getting close. Many of our new members attended our "*Learning To Fly R/C Model Airplanes*" class at COCC in January. We had nine students attend the class. So far, four have joined BAM and one other will be submitting his application in the near future. We have another class scheduled in April (13th, 15th & 18th) of this year, so we may see continued growth in membership as a result.

I want to thank our existing members for making our new members feel welcome during our recent outings at Popp's Field. It is great to see our seasoned veterans interact with our new members (and guests) in such a positive way. Many of our "new folks" have mentioned how welcome they feel. I think this is a sign of a healthy club.

As our club grows we must continue to keep safety in mind as we prepare our planes, helicopters and multi-rotor aerial vehicles for flight at Popp's Field. Not only will we be leading by example, but we will proactively reduce the potential for accidents and injury by adhering to our safety guidelines. Please remember to be courteous to our other pilots while preparing and flying your aerial vehicles. Communication is a key ingredient here. Stay behind the safety fence while flying and don't stand in the taxiways while flying. By flying with safety in mind, our number of incidents should remain low as we increase our numbers in BAM in 2015.

Have a Great Time Flying!

Greg McNutt

Safety Officer

Bob Ingram

Well 2015 is a new year and with that came a 'new' safety officer (me). I am looking forward to helping BAM anyway I can so that everyone will fly SAFE and have LOTS of FUN.

SAFE and FUN are the 2 key words for 2015 (and ALWAYS) and primarily that comes from common sense, not a lot of rules. Rules do not solve problems or stop accidents … people do with common sense. Oh, yes, there is always a chance for incidents to occur, but those are normally the result of not using your common sense and being careless.

AMA has published a set of rules (guidelines) as well as BAM (both are in the monthly newsletter) … everyone should refresh their memories of these rules while flying in 2015. It is amazing how we sometimes forget the 'little' things.

In 2014, BAM added a couple rules that were aimed at safety such as (1) no taxiing in the pits and (2) all start up should occur on the taxiway or one of the startup stands. This applies to electric airplanes as well (please do NOT arm your electrics while still at a setup table).

Pay attention to the 'dead line' (primarily do NOT fly over the pits), fly SAFE and have a GREAT 2015 season with lots of FUN. Bob Ingram

Knowing your CG

By Waldemar Frank

If you have ever experienced the flight characteristics of an unstable airplane due to an incorrect location of the airplane's center of gravity (CG), you probably know what an uncomfortable and helpless feeling it can be to fly the airplane—especially if your flight ends in disaster after a desperate attempt to take off and land safely.

Unless you design an airplane from scratch (I mean really from scratch—not plans), most of us will never have to figure out (calculate) the proper CG location. Typically the CG location is listed in the instructions that come with an ARF airplane and other pre-manufactured airplanes that we can buy. And you may have noticed that the CG location is often listed as a distance measured from a specific reference point (usually the leading edge of the root rib of the wing). Sometimes you are given an acceptable CG range with a forward and an aft location, including any values in-between.

Moreover, the instructions focus on the CG location that ensures longitudinal stability (motion around the pitch axis) since it greatly impacts the ability to safely fly an R/C airplane. Likewise, when talking about stability, one automatically assumes natural static stability by design. In other words, all model airplanes are configured to have natural static stability since our human capabilities to quickly react and control an airplane have limitations. That is, natural static stability is a fundamental requirement in order to ensure a flyable R/C airplane. In contrast, modern fighter jets are all unstable and require a flight control system (software and hardware) to allow a pilot to fly them without crashing.

This brings up a key question about the relationship between CG location and natural static stability: How does the CG location affect the airplane's (longitudinal) stability?

There have been many articles in R/C magazines and discussions in R/C hobby forums that discuss the importance of the correct CG location. One often reads that a nose-heavy airplane is less challenging to fly compared to a tail-heavy airplane. However, one usually does not find a proper explanation for the actual relationship and why one is less devastating than the other. So why is an aft (too far back location) more dangerous than a forward CG location?

The first thing that needs clarification is the definition of "natural static stability." Natural static stability simply means that an airplane will have the tendency to naturally return to a stable (initial) flight condition without the pilot's input when disturbed by an external force such as a wind gust. For example, if a wind gust pushes the airplane's nose up, a naturally stable airplane will generate a compensating pitch moment that will move the nose

down (decrease the pitch angle). This is different from a balanced airplane, which usually refers to the trim settings so the airplane flies in a straight line (e.g., like a car with proper wheel alignment so it doesn't pull to the side when letting go of the steering wheel).

The ability to naturally return to a stable (initial) flight condition is a design challenge. That is, the geometric design and weight distribution (inertia) of the airplane determine its stability. For instance, imagine holding one end of a pencil between your fingers while the other end dangles down. As the pencil's end dangling down is pushed out of position, gravity will act as a balancing (correcting) force and return the pencil back to its original position where it comes to rest again. It doesn't really require you to do anything to return the pencil to its original position.

Now imagine trying to balance the pencil on your index finger. It will be very hard to do so effectively since gravity now acts as a disturbing force trying to tip the pencil over. This would be an unstable condition because it requires you to constantly readjust your finger to prevent the pencil from tipping over. And this is exactly what a flight control system does on an unstable airplane such as a fighter jet.

Furthermore, an airplane must be dynamically stable to dampen any motion created by external forces. Dynamic stability means that an airplane will not only naturally return to its initial position, but accomplish this within a reasonable time. "Reasonable" is a design question and also a question of preference.

To provide a simple analogy, think of a pendulum that is at rest at first. You then move the pendulum's weight out of its center position and let it go so it starts to swing back and forth. As gravity acts upon the pendulum weight as an external restoring force, it causes the weight to swing back and forth. Friction at the pivot point and air (drag) slowly dampens your initial push until the pendulum eventually comes to rest again at the original center position. The actual pendulum design (e.g., length of pendulum arm) will define the overall swing time. If the pendulum comes to rest after a certain time, one could refer to it as dynamically stable; meaning that although it will take a while the pendulum will eventually stop swinging.

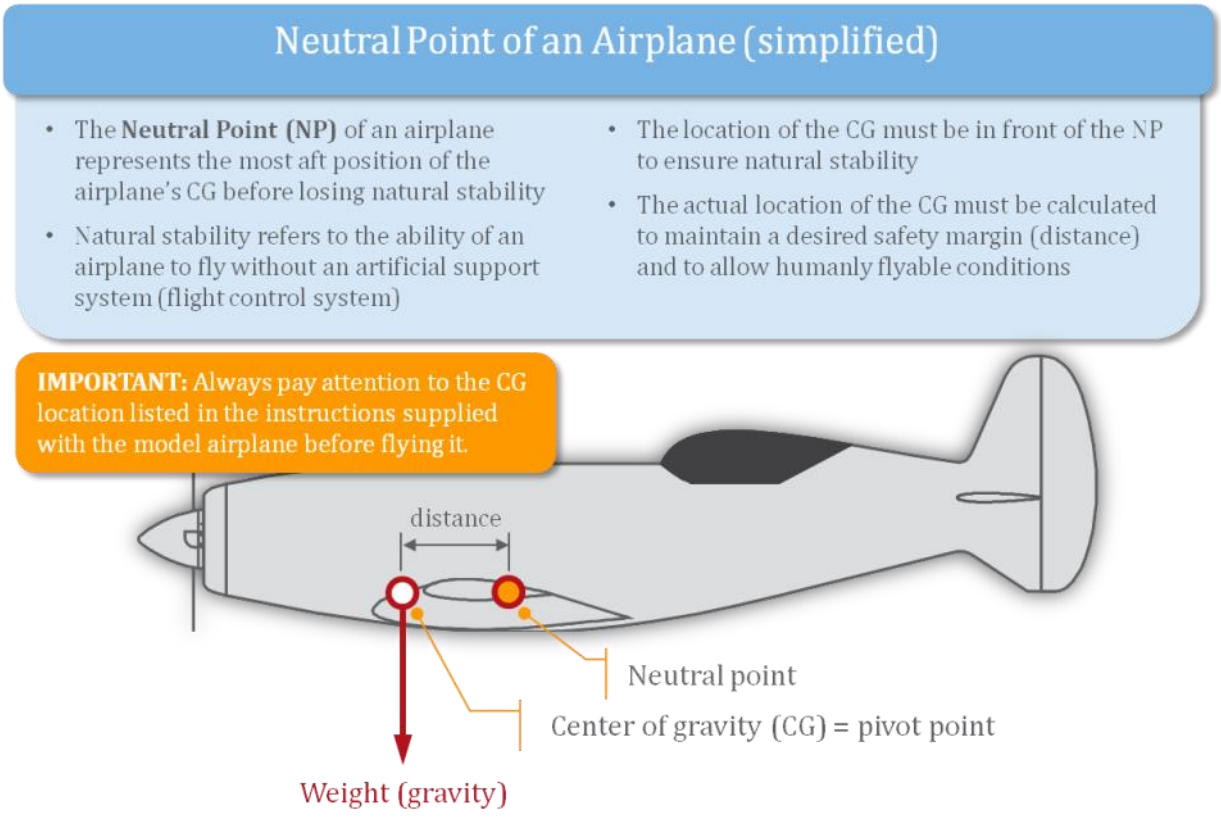
Now imagine that after the initial push, you wait for a while and then push again so that the pendulum's amplitude increases its current amplitude. You continue "disturbing" the pendulum in consistent intervals. If the pendulum sufficiently reduces its amplitude with each swing it could be considered dynamically stable because it has the tendency to come to rest eventually. If not, it might require you to change the design to ensure that it can adequately compensate for your repeated pushes. Or you might have to apply a counter force (e.g., a spring) that pushes (or pulls) in the opposite direction to dampen the swinging motion caused by gravity and to come to rest within a desired time.

This brings up another critical conclusion. Natural static stability alone does not guarantee that an airplane can return to its initial position in time—especially when repeated

disturbances push the airplane out of its initial position (which is usually the case in nature when flying through the atmosphere). In other words, an (R/C) airplane must have both natural static stability and sufficient dynamic stability to be flyable.

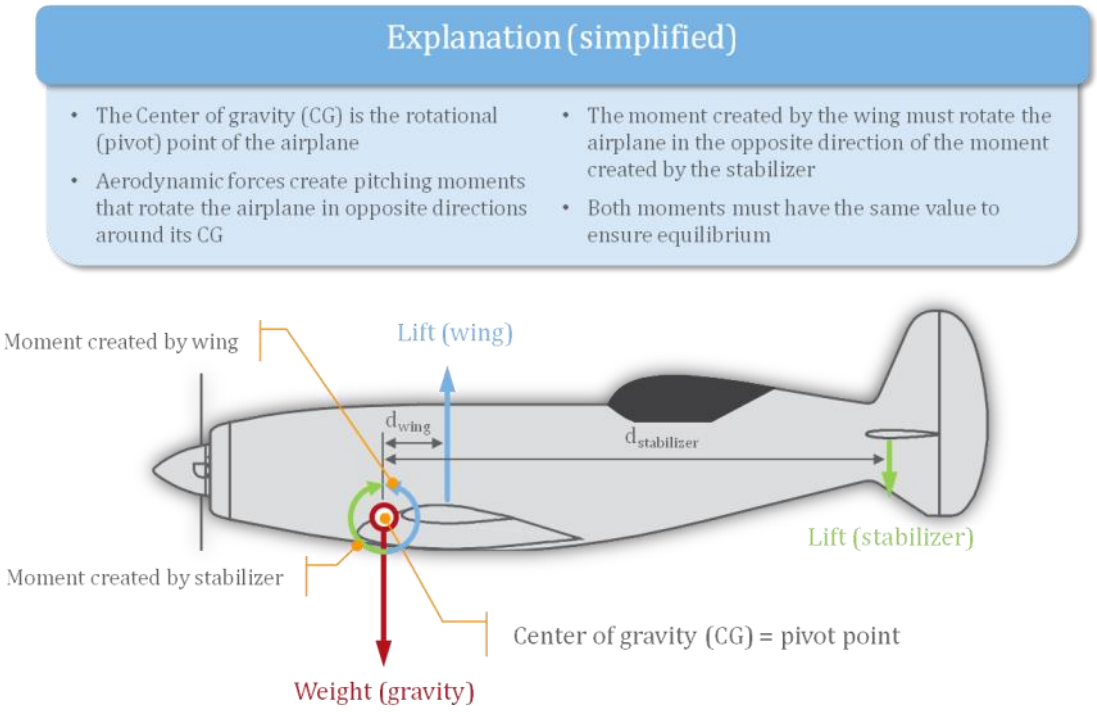
Since all R/C airplanes are designed to be naturally stable, one needs to ensure adequate dynamic stability. By design the wing and stabilizer surface areas as well as their positions are fixed and cannot be changed during flight. Since all rotational motions of an object occur around its center of gravity, the location of the CG will affect the moment arms (leverage) of the wing and stabilizer and therefore also impact how quickly an airplane rotates around its CG and how well the oscillating up and down motion after a disturbance is dampened (the "phygoid" oscillation of an airplane).

In airplane design, the so-called "neutral point" is the point that identifies the transition from natural static stability to instability and vice versa. That is, the neutral point represents the most aft CG position before the airplane is considered statically unstable. However, placing the CG at the neutral point is not recommended because it would still make the airplane uncomfortable or impossible to fly without a flight control system.



Therefore, the CG is typically positioned at a minimum distance in front of the neutral point to maintain a minimum "static margin" that provides the necessary minimal (or desired) stability for acceptable flight characteristics. The farther forward the CG is placed (in front of the neutral point), the more stable the airplane becomes.

However, greater stability has its price and makes the airplane more sluggish (less agile). For example, the airplane might respond too slowly to elevator throws—this is why fighter jets are unstable (to allow high agility).



Moreover, as one moves the CG even farther forward, the required force to keep the nose up or maintain horizontal flight must be increased. This means that the most forward CG position is limited by the stabilizer's ability to generate sufficient force (lift) to control the airplane's pitch. This is usually limited by the stabilizer's location relative to the CG and its surface area available to generate the needed force. If the CG is positioned too far forward, the elevator's maximum throws and achievable force may be inadequate to maintain horizontal flight (not to mention the ability to climb). The outcome could be that the airplane never actually takes off or it requires a much faster take off and landing speed to be flyable.

If the CG is moved too far back (closer to the neutral point), the airplane becomes more agile but also unstable. Although such an (unstable) airplane requires very small elevator input to quickly change its pitch angle, it requires constant and rapid input by the pilot to keep in the air. In addition, a tail-heavy airplane stalls easily and has a greater tendency to experience flat spins, which are usually fatal.

Both a CG too far forward and too far aft are not desired configurations because of the described negative flight characteristics. However, a tail-heavy airplane has more fatal flight characteristics due to instability. This is why pilots often say that a nose-heavy airplane is the lesser of the two evils.

In conclusion, always check your CG when assembling a new airplane and re-check your CG after modifying your airplane. You might install different equipment such as a different engine, a bigger tank, a smoke pump, use a smaller or bigger LiPo battery, or simply repair a damaged airplane, which all could affect the CG location.

When checking the CG of a new airplane, start with the listed most forward CG position. This will always give you the most stable configuration. However, I also know from experience that the recommended CG locations can be wrong on some model airplanes and one wonders how manufacturers determined them in the first place (probably not by actually test flying the airplane).

Therefore, always perform a few test flights to get a feel for the airplane's stability and agility. If it feels stable, but requires a lot of up-elevator or slowly responds to up-elevator input, move the CG a bit further back (within the acceptable recommended limits).

Fly the airplane again after changing the CG and note the difference. Repeat the process until you feel comfortable with the flight characteristics. Nevertheless, please note that you should also set the recommended throws for all control surfaces prior to your first flight to exclude the potential impact of the throws on the responsiveness of the airplane. For example, you can set low and high rates and confirm different throws during your test flight to ensure that the sluggishness of the airplane is not an issue of throw settings.

Hopefully this article helps with the understanding of longitudinal stability and the impact of the CG location on an airplane's flight characteristics.

Be safe and fly safely!

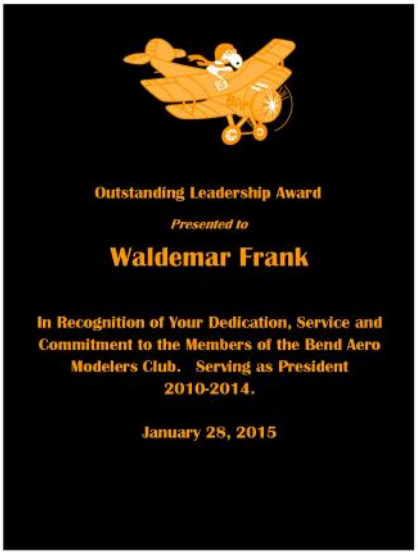
Waldemar

Highlights from the January Meeting

Awards

Waldemar Frank was honored for his leadership contribution over past several years. Waldemar served as the Bend Aero Modelers President from 2010 through 2014. Waldemar has helped shape this club into what it is today. Waldemar received a standing ovation from all who were in attendance at the meeting. Thank you Waldemar.

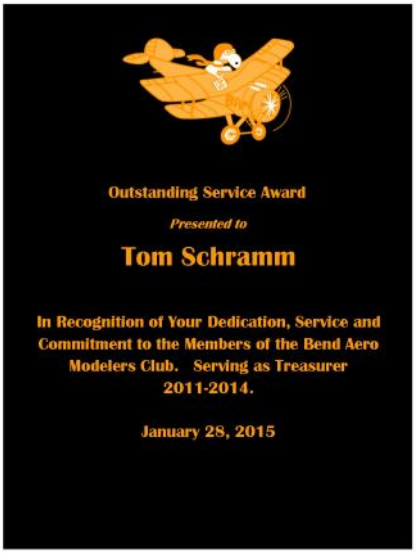
Greg McNutt presenting the Outstanding Leadership Award to Waldemar Frank.



Tom Schramm was also honored for his service contribution to the club. Tom served as Treasurer for Bend Aero Modelers from 2011-2014. In addition to serving as , Tom contributed his time on so many field improvement projects. One of the highlights would have to be Tom's design of our safety fence!

Thank you Tom!

Greg McNutt presenting the Outstanding Service Award to Tom Schramm.



Highlights from the January Meeting—continued

Crash Trophy

Andy Niedzwiecke received the **Crash Trophy** for January. Andy failed while trying to prove the theory that trees are ninety percent air. One of the juniper trees just east of our runway scored a knockout in the first round against Andy's Sig Four Star 40 airplane. Fortunately, the engine, receiver, battery and all of the servos survived the crash. The plane did not. Congratulations Andy.

Record Attendance

We had a record crowd attending the January meeting. A total of **39** people attended the meeting (27 club members and 11 guests). There was some discussion as to why the meeting was so well attended. Greg McNutt was sure that so many showed up to welcome him as the new president. Most of those in attendance didn't share Greg's sentiments. It was evident from our recent growth in meeting attendance that we had simply outgrown the Jake's Diner Conference Room.

Budget Approved—Runway Repair and extension is on the way!

Our 2015 Budget was approved during the January meeting. The budget included a provision for runway repairs in 2015. **Tom Rainwater** has been meeting with a few pavement contractors in the area for the purposes of obtaining bids to repair the runway cracks, as well as, sealing the entire runway (including taxiways). Additionally, the budget provided for an annual set-aside or reserve for future runway/field maintenance. The budget also provided for an extension of our current runway (150 feet on the east end). **Tom Rainwater** and **Greg McNutt** have met with representatives from Bend Tarp and Liner (BTL) and will obtain a bid for the runway extension. The plan is to use a durable liner material in lieu of asphalt.

Highlights from the January Meeting—continued

New Meeting Location

Due to the growing attendance at our monthly meetings, we have decided to change our meeting location. Jake's has been our meeting location for the last couple of years, but we have simply outgrown their small banquet/dining room. Beginning with our **February Meeting (2/25),** we will be meeting at the **Black Bear Diner located on the corner of Third Street and Olney.** The actual address is: 1465 NE 3rd Street, Bend, OR 97701. We will continue to start the meetings at 6:30PM, but many of us will arrive around 5:45PM for some dinner and conversation. The banquet room will seat approximately 50 people and will have enough room for our show and tell items. The food is great at Black Bear, so come early and grab a meal while you fellowship with others.

Welcome New Members

Please join me in welcoming our new members. Feel free to reach out via email to welcome them. You will find their contact info listed on our latest BAM Roster. Our new members include:

Friedhelm Baitis

Mike & Faye Dresler & Matthew Phillips (Fam)

Ben Massell & Joan Heinkel (Fam)

Joe Newman

William (Bill) Ruland

Lockheed T-33 Shooting Star

By Tom Rainwater

I brought my T-33 Shooting Star ducted fan jet to the field on Valentine's day to do a little ground testing. This is a 1:7.5 scale model of a Lockheed T-33 Shooting Star. It is made by RCLander Aircraft in China by Shenzhen Lander and distributed in the USA by ParkRCModels.com. The aircraft has a 64.5" wingspan and a length of 60". With the batteries on board the weight is 14.1lbs. It is equipped with a 120 mm 12 blade fan unit with a 680KV motor. It uses a 160Amp ESC unit powered by 2 x 6S 5000mah Lipo batteries. Full power on the bench draws about 115 Amps, which is a bit over 5000 watts. The aircraft has a functional lighting system with afterburner light ring in the exhaust. It also has flaps, air brakes, electric wheel brakes and electric retracts with gear door sequencer. It is made from EPO foam.

I bought the airplane from Max at ParkRCModels.com. When ordering the airplane you have MANY options. You specify what options you want and they build the plane for you in China with all of the options installed. When the airplane arrived it had some minor dings and dents which I tried to fix with foam specific filler and touch-up paint. I encountered significant problems finding a spray paint that both matched the current color and was safe for the EPO foam. After about ten failed attempts ,it became easier just to re-paint the entire airplane. I used a water based clear acrylic polyurethane to seal the foam first then re-painted all of the silver and red and re-touched up the black and orange. I learned a lot about dealing with foam airplanes building this model. I found three views online with all of the external placards for the T-33, so I sent them to Callie Graphics to have decals made to apply. The squadron insignia and the Tactical Air Command insignia were printed on plane paper using an ink jet printer then covered with clear packing tape and glued onto the aircraft with RC56 canopy glue. I hope to maiden the aircraft at a dry lake bed in the near future so I can learn the appropriate landing speed. Happy Flying! Tom

Flying in January & February

By Greg McNutt

The flying has been great so far in 2015. The mild weather that we have been experiencing has provided some awesome opportunities to fly at Popp's Field. Here are some pictures taken in January and February of this year . . .

Joe Newman receiving flight instruction from James Fredericks.

Flight Preparations at the beginning of the day.

Spencer Sackin preparing to fly his electric Yak.

Joe Stone & Bob Ingram discussing the flight plan for Bob's Cessna.

Steve Younger loading a few of his plans after some successful flights.

Andy Niedzwiecke with his EFX Racer. Shortly after this picture was taken, the EFX had a successful maiden flight.

Kim Nusbaum's colorful fingernail artwork. This is a rendering of Joe Stone & Kim's Cessna 150 that they recently purchased.

Larry Vose and Dave Reiss standing behind their trainer plane (Waldemar's T-28). Larry and Dave attended the "*Learn To Fly R/C Model Airplanes class*.

Greg McNutt giving instruction to Mike Dresler (left) and Matthew Phillips (right). Mike and Mathew also attended the model aviation class at COCC.

Matthew Phillips flying with Greg McNutt. Matthew did very well on the buddy box on his first day.

Mike Wissing after a successful flight with his Calypso Glider.

Joe Stone's trailer goodies. Joe always comes prepared!

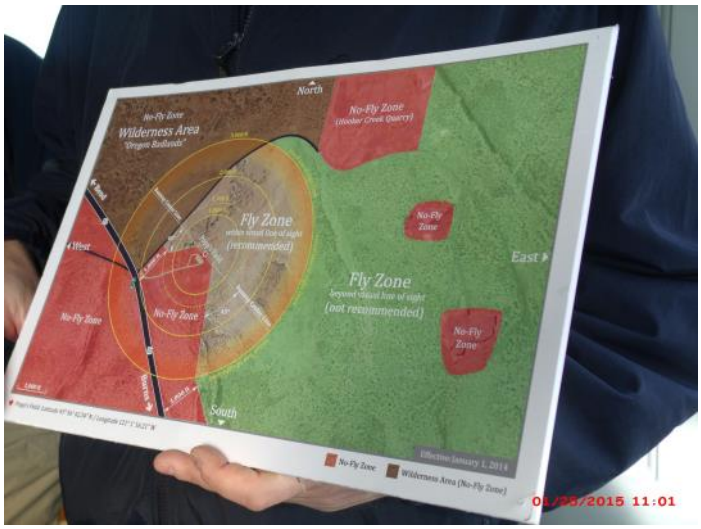
Tom Schramm waiting for his flight time!

Mike and Faye Dresler watching their son's flight.

Kim Nusbaum & Lucia Loveland soaking up the sun and enjoying the flying activities.

Diego doing a little sun worshiping!

Bob Ingram's Cessna 182.



Waldemar Frank going over our field Fly Zone map with during an orientation session with some of our guests.

The Three Amigos (Joe Newman, Dave Reiss & Larry Vose) watching the flight activities from the pits.

Andy Niedzwiecke and Greg McNutt preparing the Stearman for flight.

Mike Dresler and Greg McNutt on the buddy box.

Darrell & Lucia Loveland getting the Yak ready to fly.

Some of the BAM Fleet!

Richard Carlson preparing his Super Sportster for flight.

Lots of planes and pilots on this warm winter day at Popp's Field.

Tom Rainwater's beautiful T-33 jet.

Bob Ingram's Before and After pictures of his Explore-L plane that he bought from Paul Gumbert. Bob wanted to get away from the "Hot Pink" color. As you can see, he did a great job on this covering job!

Andy Niedzwiecke, Darrell Loveland and Paul Gumbert in pre-flight discussions.

Tom Rainwater's Pitts Biplane.

Galen Ruud's post-crash Photo Op. The bad news . . . He crashed his quadcopter on Valentine's Day. The good news . . . He found it after an extensive search and rescue operation. If it weren't for the beeps coming from the ESC, the UAV might still be out there. Except for some broken blades and arms, the UAV is in pretty good shape. Candidate for the February Crash Trophy? You bet!

Waldemar Frank preparing his T-28 for some buddy box training.

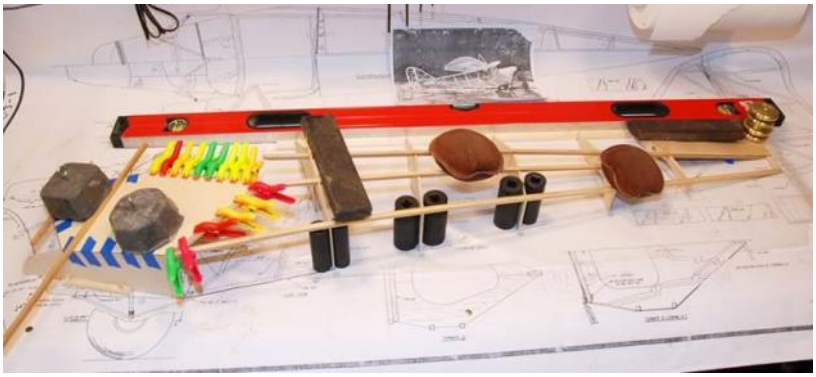
James Fredericks preparing his trainer for a little flight time.

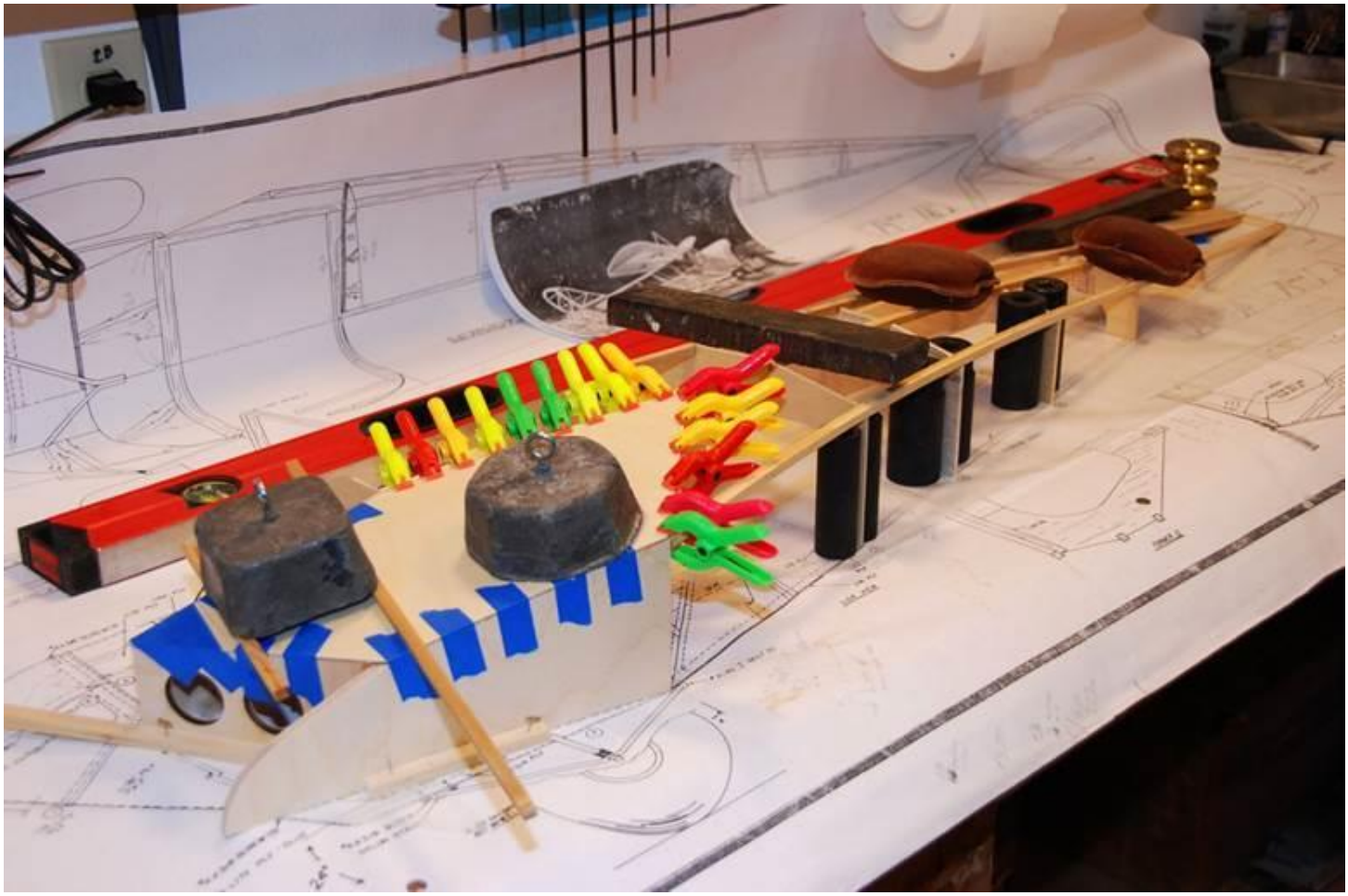
T-shirt weather in January? Absolutely! Pictured from left t to right: Greg McNutt, James Fredericks, Joe Newman, Tom Schramm, Faye Dresler, Bob Ingram, Tom Rainwater, Waldemar Frank, Tim Peterson, Steve Younger, Mike Dressler, Mike Wissing, Darrell Loveland, Matthew Phillips, Lucia Loveland, Spencer Sackin, Richard Carlson, Larry Vose, Andy Niedzwiecke, Dave Weiss.

In the Hangar

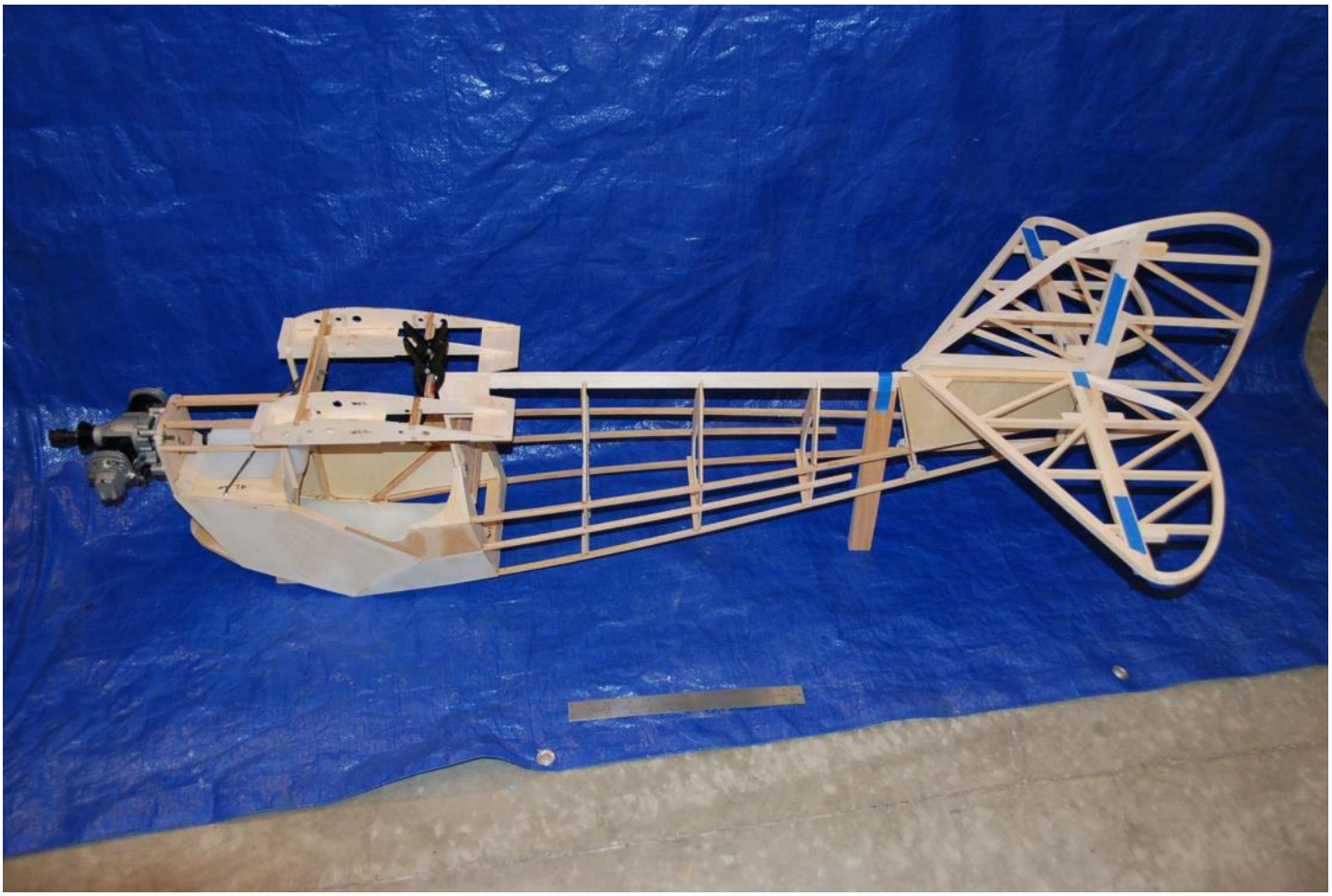
By Greg McNutt

This month's "In The Hangar" spotlight is on Tom Schramm's Aeronca C-3 build. Actually, we will follow Tom's build over the next couple of months. This is a quarter scale plane project that Tom has been working on since December of last year (2014). Keep in mind that this is **NOT** a kit build project. Rather, Tom is building the Aeronca C-3 from a **set of plans**. He is "kitting" the parts with the help of a 12" compound sliding miter saw, a 10" table say, 10" disc sander, drill press and a #11 hobby knife. Tom started construction on New Year's day. The materials that he is using include balsa, birch plywood and spruce, carpenters glue, epoxy and CA. The covering will be a bright yellow Solartex fabric with green trim.





The fuselage is constructed in a right (as shown on the previous page) left have and later will be joined to ensure straightness. The wing will be a conventional flat bottom, right and left removable panels with a servo for each aileron. Wing struts will be necessary to ensure airtight worthiness. The tail surfaces are flat, open construction that will utilize a laminated curved outline. Actuating the tail surfaces will be thru a pull-pull system for the rudder and hopefully the elevators. Tom will use a total of six servos if the elevators are conventional push rod actuated. Wheels will be the inflatable type as there is no give in the landing gear (follows the real thing). We will follow Tom's build in future newsletters. Keep up the great work Tom!



POPP'S FIELD SAFETY GUIDELINES

POPP'S FIELD SAFETY GUIDELINES

All pilots shall be current members of A.M.A. and B.A.M. Proof of current A.M.A. membership is required prior to flying at B.A.M.

Visiting A.M.A. pilots and new members of B.A.M shall receive a safety orientation prior to their first flight.

Pilots shall ensure safe flight operations in concordance with A.M.A. Safety Rules and these Field safety Guidelines.

Pilots shall ensure safe operation of their aircraft and associated equipment prior to use.

Pilots are encouraged to verbally enforce safe flying practices.

All guests, children, and pets shall be supervised by a B.A.M. member while inside the flying field and are encouraged to remain behind the pit tables.

All pilots shall restrain their aircraft during the start-up/arming process. This includes electrics.

Pilots shall never leave their aircraft unattended while the aircraft is running or armed..

Pilots shall only taxi aircraft in the specified taxi area and use caution while taxiing.

While flying, pilots are encouraged to remain 25 feet behind the closest edge of the runway, preferably behind a pilot station.

POPP'S FIELD SAFETY GUIDELINES

POPP'S FIELD SAFETY GUIDELINES

Pilots only are permitted beyond the flight line (e.g., to retrieve an aircraft)

Landing aircraft have the right of way. Dead-stick landings shall be announced as such and given full priority.

Pilots shall communicate any aerobatic maneuvers such as, low passes, touch and go's, and hovering directly near or above the runway.

Pilots shall not take-off or land on the taxiways.

A maximum of five (5) aircraft is allowed in the air at one time. This includes helicopters and micros.

Pilots shall call all maiden flights prior to flight. All other aircraft shall be grounded throughout the entirety of the flight.

Hand launches shall be performed approximately 25 feet from the edge of the runway closest to the pilots' station.

Pilots using AM/FM radio equipment shall have the appropriate frequency pin attached to the transmitter antenna whenever the radio is in use.

R/C cars and other surface vehicles are prohibited anywhere inside the flying field.

Smoking is prohibited anywhere inside the flying field and shall be carried out in a safe and respectful manner in the parking lot.

Academy of Model Aeronautics National Model Aircraft Safety Code

Effective January 1, 2014

A. **GENERAL**: A model aircraft is a non-human-carrying aircraft capable of sustained flight in the atmosphere. It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and any additional rules specific to the flying site.

1. Model aircraft will not be flown:
   (a) In a careless or reckless manner.
   (b) At a location where model aircraft activities are prohibited.
2. Model aircraft pilots will:
   (a) Yield the right of way to all human-carrying aircraft.
   (b) See and avoid all aircraft and a spotter must be used when appropriate. (AMA Document #540-D.)
   (c) Not fly higher than approximately 400 feet above ground level within three (3) miles of an airport without notifying the airport operator.
   (d) Not interfere with operations and traffic patterns at any airport, heliport or seaplane base except where there is a mixed use agreement.
   (e) Not exceed a takeoff weight, including fuel, of 55 pounds unless in compliance with the AMA Large Model Airplane program. (AMA Document 520-A.)
   (f) Ensure the aircraft is identified with the name and address or AMA number of the owner on the inside or affixed to the outside of the model aircraft. (This does not apply to model aircraft flown indoors.)
   (g) Not operate aircraft with metal-blade propellers or with gaseous boosts except for helicopters operated under the provisions of AMA Document #555.
   (h) Not operate model aircraft while under the influence of alcohol or while using any drug that could adversely affect the pilot's ability to safely control the model.
   (i) Not operate model aircraft carrying pyrotechnic devices that explode or burn, or any device which propels a projectile or drops any object that creates a hazard to persons or property.
   Exceptions:
   - Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight.
   - Rocket motors (using solid propellant) up to a G-series size may be used provided they remain attached to the model during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code but may not be launched from model aircraft.
   - Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Team AMA Program Document. (AMA Document #718.)

   (j) Not operate a turbine-powered aircraft, unless in compliance with the AMA turbine regulations. (AMA Document #510-A.)
3. Model aircraft will not be flown in AMA sanctioned events, air shows or model demonstrations unless:
   (a) The aircraft, control system and pilot skills have successfully demonstrated all maneuvers intended or anticipated prior to the specific event.
   (b) An inexperienced pilot is assisted by an experienced pilot.
4. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

B. **RADIO CONTROL (RC)**

1. All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others.
2. A successful radio equipment ground-range check in accordance with manufacturer's recommendations will be completed before the first flight of a new or repaired model aircraft.
3. At all flying sites a safety line(s) must be established in front of which all flying takes place. (AMA Document #706.)
   (a) Only personnel associated with flying the model aircraft are allowed at or in front of the safety line.
   (b) At air shows or demonstrations, a straight safety line must be established.
   (c) An area away from the safety line must be maintained for spectators.
   (d) Intentional flying behind the safety line is prohibited.
4. RC model aircraft must use the radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.
5. RC model aircraft will not knowingly operate within three (3) miles of any pre-existing flying site without a frequency-management agreement. (AMA Documents #922 and #923.)
6. With the exception of events flown under official AMA Competition Regulations, excluding takeoff and landing, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and the pilot's helper(s) located at the flightline.
7. Under no circumstances may a pilot or other person touch an outdoor model aircraft in flight while it is still under power, except to divert it from striking an individual.
8. RC night flying requires a lighting system providing the pilot with a clear view of the model's attitude and orientation at all times. Hand-held illumination systems are inadequate for night flying operations.
9. The pilot of an RC model aircraft shall:
   (a) Maintain control during the entire flight, maintaining visual contact without enhancement other than by corrective lenses prescribed for the pilot.
   (b) Fly using the assistance of a camera or First-Person View (FPV) only in accordance with the procedures outlined in AMA Document #550.
   (c) Fly using the assistance of autopilot or stabilization system only in accordance with the procedures outlined in AMA Document #560.

C. **FREE FLIGHT**

1. Must be at least 100 feet downwind of spectators and automobile parking when the model aircraft is launched.
2. Launch area must be clear of all individuals except mechanics, officials, and other fliers.
3. An effective device will be used to extinguish any fuse on the model aircraft after the fuse has completed its function.

D. **CONTROL LINE**

1. The complete control system (including the safety thong where applicable) must have an inspection and pull test prior to flying.
2. The pull test will be in accordance with the current Competition Regulations for the applicable model aircraft category.
3. Model aircraft not fitting a specific category shall use those pull-test requirements as indicated for Control Line Precision Aerobatics.
4. The flying area must be clear of all utility wires or poles and a model aircraft will not be flown closer than 50 feet to any above-ground electric utility lines.
5. The flying area must be clear of all nonessential participants and spectators before the engine is started.