

# Propwash

Official newsletter of the Propnuts Radio Control Model Airplane Club  
Highlands, Texas

www.propnuts.com

Editor: Paul Shaffer

July 2006

## Color Theory for Models: Choosing the Right Color

by Dr. Robert Suding

All RC fliers have gotten that "I can't tell which way it's going" feeling when learning to fly RC. Several simple color trimming steps can help you fly your airplane better, whether you are a beginner or top dog in Pattern.

Most airplanes, especially ARFs, are covered or painted to look good in the store. But in the air it's a different story. The situation is very simple-if you can't see it, you can't fly it. To successfully fly an RC aircraft, the pilot must have good orientation and distance perception. The eyes estimate aircraft orientation based on the perceived position of the model's outer edges, and the relationship of these outer edges to the edges of any discernible trim markings on the airplane's wings or fuselage. Distance perception, in turn, depends on a combination of one's perception of the aircraft's outside edges and its estimated orientation.

After you have located your airplane and estimated how far away it is, you must immediately recognize several attitude orientations:

(Continued on page 3)

### Club Officers:

**President:** Allen Smith  
**V. President:** Bill Stevens  
**Secretary:** Tas Crowson  
**Treasurer:** Mike Irwin  
**Safety Officer:** Charlie Stevens  
**Field Marshall:** Charles Stevens  
**Directors:** David Peterson  
Dwain Hughes

### Coming Events

#### Club Meeting: Tue. July-18-2006

7:30 PM

Highlands Community Center

August 19-20  
Warbirds at Space City  
Space City RC

Sept. 1-3  
Propnuts Heli Fun-Fly  
Propnuts RC Club

Sept. 15-17  
B17 Gathering & Big Bird  
Bomber Field

Sept. 16-17  
Fromeco IMAC Classic  
Old Kingsbury Airdrome  
TriCity Flyers

Sept. 30-Oct. 1  
Warbird Weekend  
Jetero RC  
any size any power

Oct 7-8  
Best Electrics in South Texas  
Tri-County Barnstormers  
New Waverly Texas

### PROP-NUTS R/C CLUB, INC.

**Minutes of the Meeting Held  
June 20, 2006**

**Highlands Community Center, High-  
lands, Texas**

The meeting was called to order at  
7:32PM.

Twelve members signed the attendance  
log.

**Minutes:** As published in the newsletter.

**MOTION:** By Charles Stevens to ap-  
prove the May minutes as published, sec-  
ond by Bill Blakeney, Approved by a  
show of hands.

**TREASURER'S REPORT:** Mike Irwin  
read the Treasurer's Report.

**MOTION:** Upon motion by Charles Ste-  
vens, seconded by Bill Blakeney, the  
Treasurer's Report was accepted by a  
show of hands.

### OLD BUSINESS:

Web Site:

Allen reported that the work party list  
should be posted soon.

Shed Rebuild:

The final report on cost was \$4157.06  
Helicopter event:

The helicopter event was discussed Bill  
Stevens indicated that he and Gary Owens  
will donate for prize money

**MOTION:** By Bill Stevens to budget  
\$2000 for the helicopter event. Motion  
seconded by Charlie Stevens, motion  
passed by a show of hands.

Allen for volunteers to man a booth at the  
Wings Over Houston Airshow.

Field Maintenance:

The need to spread several loads of sand  
on the runway was discussed. Allen will  
check on cost.

Paul Shaffer has replaced blades on the  
mowers.

### NEW BUSINESS:

Charlie Stevens had a question about  
memberships being awarded for certain  
levels of "donations" it was determined  
that this subject has not been voted on.

(Continued on page 2)

**Happy Birthday  
To these members in  
July**

**Marty Mankinen  
Charlie Stevens**

(Continued from page 1)

**Club Apparel:**

Bill Stevens reported that he has found a company in Pasadena who will do shirts on a demand basis with iron on transfers. Hats are a minimum order of 100.

**MOTION:** By Bill Stevens to spend an amount not to exceed \$150 to purchase transfers. Seconded by Marty Mankinen, motion passed by a show of hands.

**Hot Dog Fun Fly:**

It was proposed to have a club hot dog fun fly the last weekend in July possibly combined with a fence building work party.

Allen asked the club members to think about what needs to be done in the way of field improvements.

**MOTION:** By Bill Stevens to allocate an amount not to exceed \$2500 for field improvements. Motion seconded by Marty Mankinen, motion passed by a show of hands.

**ENTERTAINMENT:**

**MODEL OF THE MONTH:**

**AIRCRAFTUS FRAGMENTUM:**

The Meeting was adjourned at 8:30 PM.  
Respectfully submitted,

Taswall G. Crowson, Jr.  
Secretary



**Precision Model Products**  
By Romco Manufacturing, Inc.  
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Quality—Unsurpassed  
Varity—Unmatched

## Odyssey R/C Hobbies has moved.

We are now on I-45 and Nasa Parkway at the shopping strip called Point Nasa. The shop is next to Office Depot. There are three ways to turn into our center - off of Nasa Parkway, off the north bound feeder of I-45 or behind the center off of Kobayashi Rd.




# Odyssey R/C Hobbies



- \*R/C Airplanes
- \*Cars
- \*Boats
- \*Rockets
- \*Plastics
- \*HO & N Scale Trains
- \*Educational/Science Kits
- \*Paints and Glues
- \*Tools & Wood Supplies

1020 Nasa Parkway  
Webster, TX 77598  
281-557-1424  
at I-45 and Nasa Parkway

Thur 10:00am to 8:00pm  
M-Sat 10:00am to 7:00pm  
Sun 12:00pm to 5:00pm



*(Continued from page 1)*

- \* Is it flying toward me or away from me?
- \* Is it upright or inverted?
- \* Are the wings flat, vertical, or tipped?
- \* Is it flying horizontal, upward, or downward?
- \* Is it flying parallel to the runway or vectored?
- \* Is it flying perfectly vertical or skewed sideways or fore/aft?

The following suggestions will help you with distance and attitude perception. Visual acuity and contrast perception diminish with age, but by using correct color concepts, even senior fliers will find that visual orientation of their aircraft can be consistently and reliably achieved.

#### Solid-Colored Aircraft

RC airplanes are flown in all kinds of weather and background conditions. A solid-colored aircraft will sooner or later fly into a condition where it blends into the background. This will result in a complete loss of location and orientation since no edges can be perceived. The absolute worst, in my opinion, is a silver Mustang in a heavily overcast sky. Yellow Cubs are tough to see when back lit by the sun. I had a dark green airplane that would disappear when I landed with a background of green trees. Red Sticks and dark blue airplanes go invisible in late evening and storm conditions. A solid-colored airplane is easier to cover, but it won't do you any favors up in the sky.

#### Wing and Horizontal Stabilizer Shades

The top of the wing and horizontal stabilizer is normally lit by sunlight. The bottom of the wing and horizontal stabilizer is shadowed. Coloring the top lighter and the bottom darker keeps this same relationship even in changing lighting conditions. ARFs are classic blunders in coloring. Either they have identical top and bottom wing colors, or they put some token color on the top of the wings and leave them white underneath. They look good in the store, but don't help the beginner at all. I always recommend that beginners cover the bottom of the wing and the bottom of the horizontal stabilizer with dark-blue contact paper before flight. When flying at a distance of 500 feet or more (depending on the size of the model and lighting conditions) you can't see colors, because the cones of your eyes that perceive color are 2,000 times less sensitive than the rods, which perceive illumination. In these circumstances, your gray-scale vision (your perception of lightness and darkness in a black-and-white image) provides your orientation and depth perception, not color. Any series of adjacent colors on your aircraft that are intended to facilitate orientation should therefore be gray-scale opposites. For example, a series of bands consisting of red, yellow, blue, and then white is desirable. Don't assume a series of "color opposites" such as red, green, blue and black will be effective. These all have the same

dark gray-scale shade and will show an equal tendency to disappear in a deep blue or heavily overcast sky.

If you use the wrong series of color bands, you won't know how far away your aircraft is, and you won't even know which way it's heading to bring it back. Also, don't rely on intricate patterns. They blend together to form edgeless fuzz approximately 100 feet away. You can test potential color schemes for gray-scale perceptibility by video taping and playing back alternative color schemes on a black-and-white television or on a color television with the color control turned down.

Actual Patterns to Use ([click here to see the pattern](#))

The best color scheme for beginners that I have found is a combination of large starburst patterns on top of the wing and horizontal stabilizer, and a solid dark color underneath the wing and horizontal stabilizer.

Beginners consistently become perceptually disorientated when flying at a distance, especially when the airplane flies at a 45° angle away or toward the pilot, since the aircraft silhouette is identical. With the starburst pattern, all the beginner has to do is slightly roll the wings towards him, and the starburst pattern becomes an arrowhead, pointing in or out, the direction of flight.

Start by covering the bottom of the wing and horizontal stabilizer with any dark color. The exact color could be black, deep red, dark blue, or green, it doesn't matter; they will be the same gray-scale color at a distance. Then put a 2-inch strip of some light color along the leading edge of the bottom. Do the same for the bottom of the horizontal stabilizer, and make the light strip roughly 1 inch wide. The base color of the top of the wing must be a very light color such as white, yellow, or some other very light color. The starburst pattern starts out at the center of the wing, from 3/8 inch under the wing's leading edge to roughly 1 inch back from the leading edge at the top. Then it is a large "pie slice" to the wing tip, where it extends from 3/8 inch under the wing leading edge to the trailing edge on the top. A second pie slice of a different dark color extends from the center of the wing to points one third and two thirds out on the wing. Both sides of the wing are colored like this as is the top of the horizontal stabilizer.

#### Landing Considerations

Landing requires keeping your wings flat and knowing where you are in the landing approach. You are generally close to the airplane during the later stages of the landing approach, so your color perception is improved, but the wings will be edge-on to your line of sight. The leading edges should be very prominent against any background such as blue sky, white clouds, dark overcast, distant mountains, or green trees. All of these items have spectral lines toward the higher frequency blue or green region, so a very simple

*(Continued on page 4)*

solution would be to have a low frequency color such as red or orange on your wing and horizontal stabilizer leading edge. At the field where I fly in Colorado, ARFs with blue wing edges are almost invisible when a low approach from the West dips the airplane visually below the mountains, resulting in very klutzy landings by beginners.

The leading edge red or orange pie slice is wrapped around the leading edge so that it has the maximum area of visibility when edge on. The 2-inch strip of white on the bottom of the wing near the leading edge will become visible during the landing flare, aiding in precision landings.

I prefer a white background on the top of the wing and horizontal stabilizer, with a bright red leading edge pie slice and a metallic blue inner pie slice on trainer airplanes. The same metallic blue under the wing looks nice, but any dark color works fine

#### Fuselage and Rudder Coloring

The same coloring rules apply to the fuselage. Keep the top of the fuselage light, and the bottom dark.

The sides of the fuselage should aid you in flying horizontal passes. A solid color fuselage is very difficult to keep straight and level because all of the aircraft reference lines are curved. Light blue-and-white fuselages (a favorite ARF color scheme) blend in with the sky and clouds too well, and will become invisible under some lighting conditions.

Draw a line along the thrust line of your aircraft, roughly splitting the top and bottom of the sides in half. Make the top half of your fuselage sides a light color. Make the bottom half a dark color, usually one of the wing pie slice colors.

Analyze how you fly. Beginners and experts, who fly inverted much of the time, should make the fuselage line color demarcation exactly follow the thrust line. Beginners fly airplanes with lifting, flat-bottom wings, so the aircraft fuselage side flies a straight line.

The expert flies an airplane with symmetrical wings, so he flies at a slightly raised altitude to maintain level flight, whether upright or inverted. Therefore he should also have the fuselage line color demarcation exactly following the thrust line. When doing a horizontal pass, he should maintain an equal rising thrust line sight picture whether upright or inverted.

The interesting situation is the beginning aerobatic pilot. His routines do not include horizontal, inverted passes, but his maneuvers do include many horizontal flight components. He will usually be flying an aircraft with symmetrical airfoil wings, so the aircraft will be moving through the air with a slight upward orientation. He should offset the fuselage side color demarcation upward at the tail of the aircraft by roughly an inch. Now he can practice his horizontal passes by keeping the fuselage side lines parallel with flat ground.

The vertical stabilizer and rudder should have very wide hori-

zontal bands of color. Make the top of the horizontal stabilizer the same color as the wing tips. Then put a light-colored band, and below this a dark-colored band, usually the same color as the inner pie slice on the top of the wing. The base color of the vertical stabilizer and rudder should be the same light color of the wing.

Another variant for the vertical stabilizer and rudder that works well on trainers with very big tails -such as the Kadet series-is a starburst pattern on the top of the wing. This aids the beginner in determining the direction of travel when flying at a distance. The tail's starburst pattern becomes an arrowhead pointing out the direction of flight.

#### Looping

Consider what the usual looping problem always is for the beginning aerobatic pilot. The pilot does not begin the loop with his wings flat. He usually corkscrews in or out. Proper coloring of his low-wing or mid-wing airplane can be a major help.

Make the wing tips stand out. I usually make the outer 2 inches of each wing and 1 inch of each horizontal stabilizer the same bright red that I color the leading edge. If you follow my advice above on the wing bottom and the fuselage sides, the wing tip can be visually correctly placed for a perfect loop. If the wing tip is too high, resulting in a corkscrew out, the pilot will see the dark wing bottom. If the wing tip is too low, resulting in a corkscrew in, the pilot will find that the wing tip blends too well with the bottom of fuselage side. The correct sight picture will be the wingtip cleanly placed against the upper lightly colored fuselage side. Look at the International Miniature Acrobatic Club or Pattern airplane pictures in RC magazines. They always have a dark color on the top half of the fuselage side into which the wing tip blends, causing looping problems.

#### Geometric Shapes

Humans can recognize different geometric shapes 1/10 of a second faster than colors. I use this phenomenon to help me with the vertical rolls performed in advanced aerobatics. Instead of a solid dark color on the bottom of my wing and horizontal stabilizer, I put four large circles on the bottom of the wings and two large circles on the bottom of the horizontal stabilizer. The noticeably faster recognition of the round shape verses the line shape aids me in nailing the vertical rolls.

A number of people at my field have copied my bottom circles without knowing the reason why I use them. The solid colored bottom is preferred unless you are doing vertical rolls.

#### Sunglasses

Several years ago I flew with some expensive Serengetti Driver sunglasses. These had a red tint to them, I guess to cut down on the ultraviolet region. I lost visual perception on a solid dark blue airplane during a landing approach and crashed.

*(Continued on page 5)*

(Continued from page 4)

Fortunately they were stolen at a hobby store a week later, and I got some RayBan aviator sunglasses with a blue-gray tint. What a difference!

Red is at the low frequency part of the visual spectrum, and blue is at the high frequency part of the spectrum. Red or yellow-tinted sunglasses reduce all colors to high-contrast shades of gray, making your aircraft in the air appear completely different from the appearance of your aircraft at home or in the pits. Gray, light blue, or light green tinted sunglasses make the airplane in the air look just like the airplane in the pits, and because your vision is extended into the high frequency part of the visible spectrum, you will have twice the visual perception range!

Final Thoughts

\* Evaluate color schemes for visibility first, beauty second.

Dark-colored airplanes are more difficult to see in overcast skies and in the evening.

\* Scale airplanes are a special problem. Warbirds were colored to avoid detection, just the opposite of RC airplanes. Avoid flying scale-colored airplanes until you are a very experienced flier.

\* Avoid dark colors on the fuselage where your battery and receiver are located. The heat buildup can result in loss of battery capacity and premature radio failure.

\* Don't fly when someone with a airplane identical to yours is already flying. ARFs and yellow Cubs are particularly susceptible to this problem. Several years ago two fliers were flying with identical ARFs. When one of the models landed, both modelers went out to get the airplane. Much to the entertainment of the folks in the pits, one modeler discovered that his airplane had crashed out in the field five minutes previously because he had lost track of which airplane was his, and he was "flying" the wrong one.

**In another famous SR-71 story, Los Angeles Center reported receiving a request for clearance to FL 600 (60,000ft). The incredulous controller, with some disdain in his voice, asked, "How do you plan to get up to 60,000 feet?"**

**The pilot (obviously a sled driver), responded, "We don't plan to go up to it; we plan to go down to it." He was cleared.**

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**Aviation ..... Note: For those that don't know, "The Sled" is the SR-71 Blackbird spy plane from the 1960's and still the fastest airplane.**

**In his book, "Sled Driver", SR-71 Blackbird pilot Brian Shul writes: "I'll always remember a certain radio exchange that occurred one day as Walt (my back-seater) and I were screaming across Southern California 13 miles high. We were monitoring various radio transmissions from other aircraft as we entered Los Angeles airspace. Though they didn't really control us, they did monitor our movement across their scope. I heard a Cessna ask for a readout of its ground speed. "90 knots" Center replied. Moments later, a Twin Beech required the same. "120 knots," Center answered. We weren't the only ones proud of our ground speed that day as almost instantly an F-18 smugly transmitted, "Ah, Center, Dusty 52 requests ground speed readout." There was a slight pause, then the response, "525 knots on the ground, Dusty." Another silent pause. As I was thinking to myself how ripe a situation this was, I heard a familiar click of a radio transmission coming from my back-seater. It was at that precise moment I realized Walt and I had become a real crew, for we were both thinking in unison. "Center, Aspen 20, you got a ground speed readout for us?" There was a longer than normal pause.... "Aspen, I show 1,742 knots" (That's about 2004.658 mph who don't know) No further inquiries were heard on that frequency.**

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