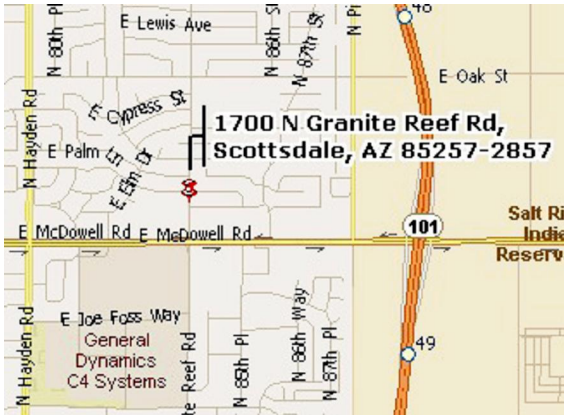
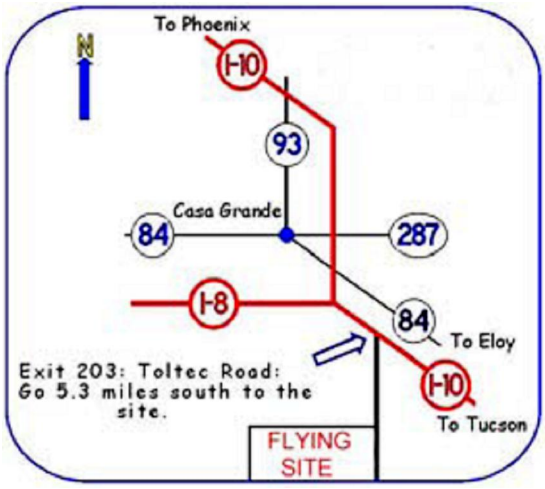
PHOENIX MODEL AIRPLANE CLUB

HAVING FUN WITH MODEL AIRPLANES SINCE 1937

VOLUME 15 NUMBER 7 ***JULY 2010***





NEXT MEETING
Tuesday August 10th
07:00 PM
Room 09
Granite Reef Senior Center
1700 N. Granite Reef Rd.

DAWN PATROL
See schedule inside.

NEXT CONTEST
FALL KICK OFF
Sunday
September 19th
WEBSTER FIELD
ELOY

CLUB OFFICERS

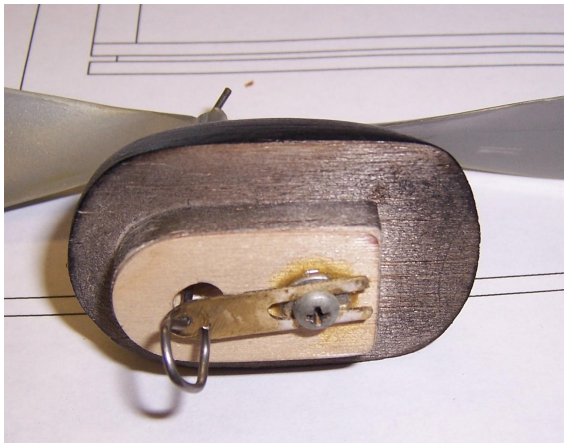
President:	Elmer Nelson (480) 460 1366
Vice President:	Tom Gaylor (480) 892 0338
Secretary:	Bill Sewel (623)-551-8678
Treasurer:	Elmer Nelson
Newsletter Editor:	Steve Riley (505) 615 8112 steveriley@cableone.net
Webmaster alan@apetersenpaintings.com	Alan Petersen

SOLUTIONS

Adjustable thrust line

Final flight trim on rubber models depends a lot on thrust adjustments. About the time you get it right with shims, they fall out and get lost.

One day while visiting Pat Tritle's shop here in Albuquerque, I found this front end. It uses a small brass strip with a slot in one end and a hole for the prop shaft in the other. The set screw goes into a blind nut epoxied into the back of the nose block. The front has a small brass plate for the prop washer to ride against.



Prop Hook

This hook will prevent the rubber from bunching and wrapping around the prop shaft. Czech hooks work . Basically the narrowing of the hook towards its center forces the tightly wound rubber to stay centered. For it to shift or slide around the side of the hook (and then climb the shaft and ruin the flight) the loop of rubber around the hook would have to stretch to 4 ot 5 times its centered length...when fully wound this cannot happen. This is particularly important for situations where you want to get a long motor with two thousand turns on it into a short fuselage.

.

And here is an easy little fixture for making your own.

A (CRUDE) EXPLANATION OF WING TIP STALL AND THE NEED FOR WASHOUT

By George White

I was recently told by Gene Smith, and Iôve seen the same information elsewhere, that the concept of adding washout to the wing tips of a model is more important for wing planforms which are elliptical or have a swept back leading edge. Having seen Geneôs models fly, I accepted that as the straight word, but my curiosity as to why thatôs true got the best of me. Having a son whoôs an aero engineer, I passed the question to him, hoping I could get an answer that a simpleminded guy like me could understand. He allowed as how the answer is really not all that simple, but there are some basic principles which help make sense, considering the low speeds we deal with on rubber models and the glide speeds on all our models.

The term ñtip stallò always comes up in the discussion of trimming a model, meaning that airflow separation (stall) occurs at the wing tip, resulting in loss of lift before the wing root reaches a stall. Of course, if both wing tips stall at the exact same airspeed and time, which with a model seldom happens, the model should just mush straight forward with no problem. But, when they donôt stall at exactly the same airspeed or time, roll forces are created which will, if not offset by other forces such as dihedral or the vertical area forward of the center of gravity, create a tendency to spiral. (See also Tom Arnoldôs article entitled ñForward Fins in the Fast Lane,ò in the Jan/Feb 2005 issue of this exciting rag, and the article entitled ñStabilityò in the Nov/Dec 2005 issue).

Having said that, the question remains as to why the wing tip might stall before the wing root stalls, assuming that the angle of attack is the same throughout the span. We get into such factors as spanwise airflow, aerodynamic twist (reduced camber from root to tip), induced drag, circulation theory of airflow over the wing, wing tip vortices, etc., the interactions of which are beyond my ability to understand, much less discuss. For those inclined to dig into this subject to the extreme, interesting references can be found on line at: *http://flighttest.navair.navy.mil/unrestricted/FTM108/c3.pdf*; and *http://www.flyingmag.com/article.asp?article_id=170&print_page=y,*
the latter of which is an article defending the ñHershey Barò wing on Piper Cherokees. Those are the sources for the extremely simplified discussion which follows.

Cutting to the chase, several statements seem to be relevant to understanding the the big WHY.

The ideal characteristics of a wing should result in airflow separation (stall) beginning on the trailing edge of the wing root and progressing gradually forward and outboard, allowing the aircraft to ñmushò forward without rolling. Lift is a function of cord, among a great many other things, but for our purposes, thatôs the critical factor. For an equivalent airfoil shape, the shorter the cord the less lifting ability it has. Thus for a given angle of attack a shorter cord at the tip means a greater lift loading per square inch compared to the greater cord at the root on an elliptical or swept back leading edge wing. The greater that lift loading, the greater the stall tendency at a given angle of attack. Wing stall starts at that point along the span which first reaches its maximum lift coefficient, and the shorter cord at the tip will reach that maximum lift coefficient first due to the higher lift loading. In other words, the shorter cord at the tip of a tapered or elliptical wing is always closer to the stall limit for a give angle of attack, and the airflow will separate there before it does at the larger cord at the root.

Interestingly, the rectangular wing will normally stall first at the root due to spanwise airflow reducing the lift coefficient at the tip, thus leaving the tip further below he lift coefficient limit (i.e. stall point) than the root as the wing approaches the critical angle of attack. How that spanwise airflow unloads the wing tip, thus raising its stall speed on a rectangular wing is beyond the scope of this discussion, but if you have great curiosity, check out the references above. All this offers the explanation as to why, in the absence of other considerations such as needing to counter thrust vectors, torque, etc., we might need to reduce the wing tip angle of attack relative to that at the root on a tapered or elliptical wing by adding a bit of washout to ñunloadò the wing tips and the tendency to stall before the root. It is also apparent that there is less need to concern ourselves with tip stall on rectangular wings and adding washout there, other factors being equal, may be accomplishing little if anything other than loss of lift.

PMAC DAWN PATROL at ELOY
Fly until 9-10AM, then adjourn for breakfast.

	Saturday	Sunday
June	5	
		20
July	3	
		18
August	1	
		14
	28	

OK – there are 7 dates to plan around, and to expect to see and fly with others this summer. See you there!

FREE!

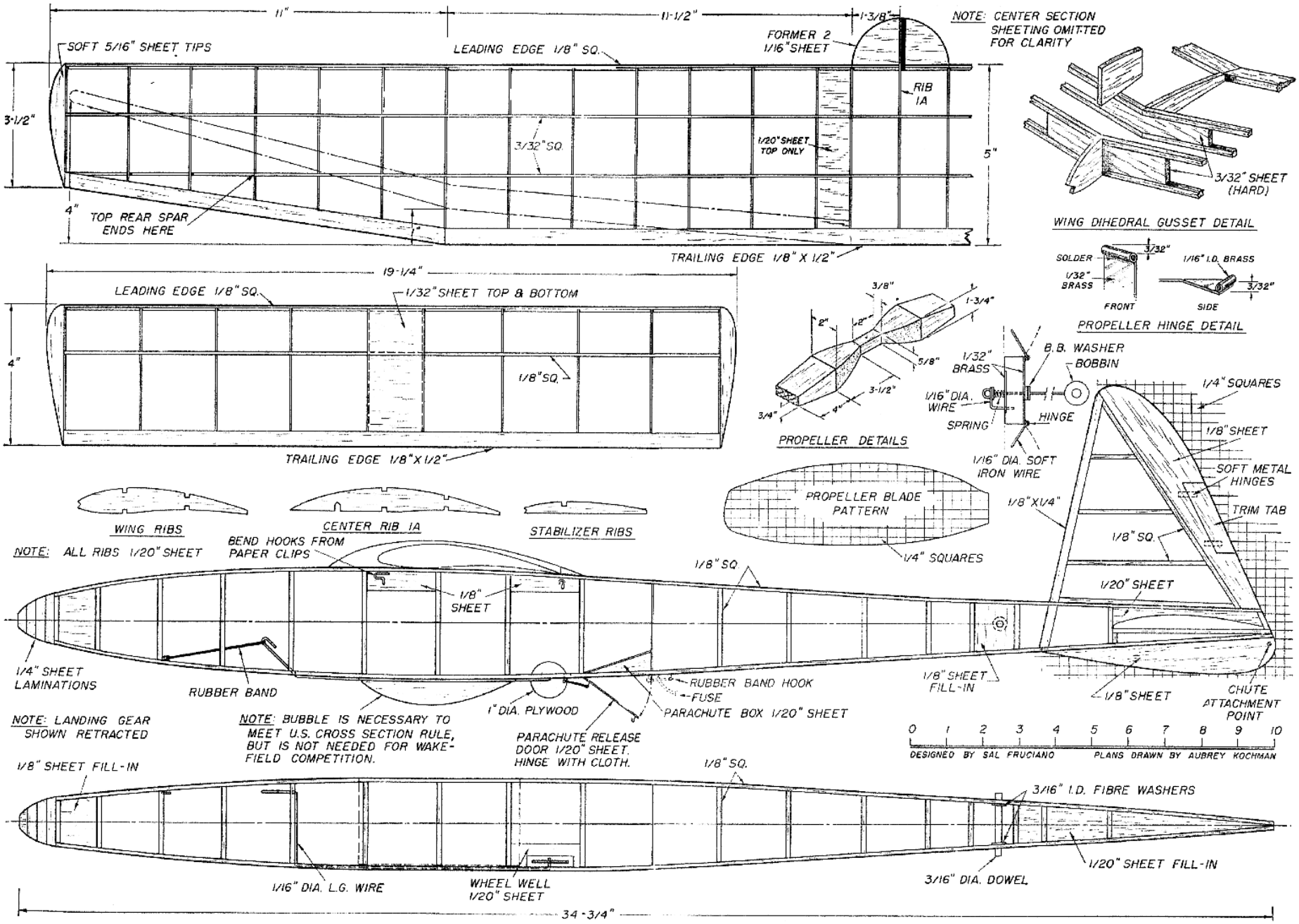
A large group of model magazines rescued from Archie Harlan's estate: There are 3 titles: Flying Models, Model Airplane News [from when they recognized Free Flight!], and American Modeler. These are from the 60s-70-80s. The 3 stacks are about 18" tall. Don't let these go to the recycle bin! We need to recycle these to modelers. Please take them all, though might split them up if there are multiple interested parties. AL Lidberg 480-839-8154; call for directions to my house in Tempe [not the 1030 E Baseline address].

THE RANGER

Many of you remember Sal Fruciano. For several decades he worked hard to help this club as well as the Southwest Regionals. Sal was always there to help and encourage modelers.

Sal designed this model back in the late 40s, refined it over a couple of years and set a record with it in 1950. The final plan was then published in the March 1951 issue of Model Airplane News magazine. A parachute kit can be found where model rocket supplies are sold.

Thanks to Mike Fruciano for sharing the plan with us.


11"
11-1/2"
1-3/8"
SOFT 5/16" SHEET TIPS
LEADING EDGE 1/8" SQ.
FORMER 2
1/16" SHEET
RIB
1A
3-1/2"
3/32" SQ.
1/20" SHEET
TOP ONLY
5"
4"
TOP REAR SPAR
ENDS HERE
TRAILING EDGE 1/8" X 1/2"
NOTE: CENTER SECTION
SHEETING OMITTED
FOR CLARITY
3/32" SHEET
(HARD)
WING DIHEDRAL GUSSET DETAIL
SOLDER
3/32"
1/16" I.D. BRASS
1/32"
BRASS
3/32"
FRONT
SIDE
PROPELLER HINGE DETAIL
19-1/4"
LEADING EDGE 1/8" SQ.
1/32" SHEET TOP & BOTTOM
4"
1/8" SQ.
TRAILING EDGE 1/8" X 1/2"
3/8"
1-3/4"
2"
2"
5/8"
3-1/2"
3/4"
4"
PROPELLER DETAILS
B.B. WASHER
BOBBIN
1/32"
BRASS
1/16" DIA.
WIRE
SPRING
HINGE
1/16" DIA. SOFT
IRON WIRE
1/4" SQUARES
1/8" SHEET
SOFT METAL
HINGES
TRIM TAB
1/8" X 1/4"
1/8" SQ.
1/20" SHEET
PROPELLER BLADE
PATTERN
1/4" SQUARES
WING RIBS
CENTER RIB 1A
STABILIZER RIBS
NOTE: ALL RIBS 1/20" SHEET
BEND HOOKS FROM
PAPER CLIPS
1/8" SQ.
1/8"
SHEET
1/4" SHEET
LAMINATIONS
RUBBER BAND
RUBBER BAND HOOK
FUSE
1" DIA. PLYWOOD
PARACHUTE BOX 1/20" SHEET
1/8" SHEET
FILL-IN
1/8" SHEET
CHUTE
ATTACHMENT
POINT
NOTE: LANDING GEAR
SHOWN RETRACTED
NOTE: BUBBLE IS NECESSARY TO
MEET U.S. CROSS SECTION RULE,
BUT IS NOT NEEDED FOR WAKE-
FIELD COMPETITION.
PARACHUTE RELEASE
DOOR 1/20" SHEET.
HINGE WITH CLOTH.
0 1 2 3 4 5 6 7 8 9 10
DESIGNED BY SAL FRUCIANO
PLANS DRAWN BY AUBREY KOCHMAN
1/8" SHEET FILL-IN
1/8" SQ.
3/16" I.D. FIBRE WASHERS
1/16" DIA. L.G. WIRE
WHEEL WELL
1/20" SHEET
3/16" DIA. DOWEL
1/20" SHEET FILL-IN
34-3/4"

"The Right Stuff: A Maverick Flier Scales New Heights."

Wall Street Journal, April 23, 1998

"How Mr. Andriukov Rocked the Model Plane World; More Than Rubber Bands. Talk about tightly wound. Alexander Andriukov stands in a vast brush-covered field, his hands wrapped around a model airplane with a five-foot wingspan. He grabs the propeller and gives the powerful rubber band inside its fuselage a twist. Then he takes a quick step and hurls it into the air. The plane shoots off into the cloudless California sky, and three minutes later, the craft drifts back to earth - just about a mile (away).

"For years, fliers of Wakefields - among the world's highest performance rubber-band-powered planes - personally constructed their craft in basement workshops or garages. Then Mr. Andriukov, a Ukrainian aeronautical engineer - and the field's current world champion - propelled a slew of high-tech ideas into the world of Wakefielders. This most arcane of sports hasn't been the same since.

"Mr. Andriukov equips his planes with complex delayed-release propellers that allow him to hurl them like javelins at the beginning of the flight. His ingenious front end changes the propeller's pitch in midflight to keep the revolutions high.

"He even put a special heater on his planes to put more snap in their rubber bands. The idea sparked such long flights that the device has been banned by the Paris-based Federation Aeronautique Internationale, which sets the ground rules for aviation contests.

"Because of his wizardry, Mr. Andriukov last summer became the first three-time winner of the Wakefield trophy when his final flight stayed aloft for seven minutes and 44 seconds - the best time in that competition (But didn't Dick Korda's winner stay aloft for 43 minutes in 1940? The reporter should have reported that, too...Editor Joe). Forty-two years old in a sport where people compete into their 60s, Mr. Andriukov is widely considered to be the best Wakefield flyer ever. (But the contest field isn't very level, is it, with a high-tech model being compared with balsa and sticks of FAC days....Editor)

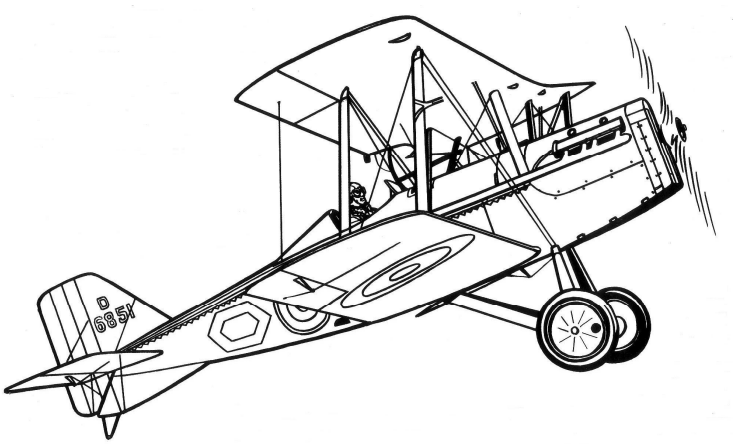
These aren't the rubber-band-powered planes furtively launched at third-grade teachers. Rather, they cost up to $1,500 apiece, pack as much energy as a bullet leaving a gun, and can gain thousands of feet of altitude if they catch a thermal. They weigh only eight ounces and are powered by little more than an ounce of lubricated rubber strands.

"The rubber motor is so taut that competitors use a device that looks like a hand drill to crank them up, straining like fishermen reeling in marlin as they do so. Only a single supplier in the world, John Clapp of Sayre, Penn., sells the springy rubber used in Wakefields, and he refuses to disclose where he buys it. Each time he receives a new batch, Mr. Clapp sends samples to a select bunch of fliers who test it on homemade stretching contraptions.

"Robert Piserchio, a former member of the U.S. National Wakefield team, uses a 14-foot long board and a boat winch to study the energy retention of each new shipment. Last July, he received a now legendary batch of that tested better than anything I had tested before,' he recalls. 'I quickly called up my friends and said, 'Buy all you can.'"

"Founded by Lord Wakefield of Hythe in 1928, the biennial Wakefield competition takes place all over the world. Next year's competition will be held in Israel (WS editor: The date of this article is April 23, 1998); last year it was in the Czech Republic, where Mr. Andriukov was again named champion.

"Mr. Andriukov's design changes have so recast the sport that many top fliers now purchase parts or entire planes from Eastern Europe, where a cottage industry has sprung up to produce models designed by Mr. Andriukov and other top Eastern European fliers. Some old time fliers are irked by the developments in their field. David Hipperson qualified for the British Wakefield team but declined to compete at the 1997 world championship as a protest against the use of purchased airplanes by competitors. 'I'm quite happy to fly against Andriukov and his airplanes,' says Mr. Hipperson. 'But I get a little cheesed off when I fly against him and a dozen others with identical airplanes.'
"Wakefield flyers typically become involved with the sport as children and often fly for 40 or 50 years. Mr. Andriukov began flying model planes at age six in Latvia, where his father was a general in the Soviet missile command. He made the national team in 1981, receiving treatment similar to that given champion athletes, including foreign travel and a yearly spring training session. But Mr. Andriukov's engineering job in Ukraine was a casualty of the economic collapse in the early 1990s. For a few years, he supported his family by exporting Wakefield planes. He moved to the Los Angeles area last year after a model-making buddy got him an engineering job at AeroVironment Inc., where he joined a team working on a solar-powered high-altitude flying wing to be used by NASA.
"He has become a regular participant at regional competitions like the one last weekend at Taft, a tiny oil-patch town an hour and a half north of Los Angeles. Taft is one of the few places in Southern California with the huge spaces and relatively tranquil winds required for flying Wakefields. The planes, which are not radio-controlled, are guided based on how the flyers have preset the rudders and other controls. The competition starts with seven three-minute flights spread over seven hours. Fliers know if they don't hit three minutes in all the flights - or their craft fly out of sight - they are out of the competition, but the mood is still relaxed. 'I will try, but not too seriously,' promises Mr. Andriukov, who freely banters with the rest of the competitors between long hikes to retrieve his plane. Seven of the 13 competitors, including Mr. Andriukov, qualify for the fly-off. Everyone takes a break until the late afternoon, when the winds are calmer.
"When they return, it's a different Mr. Andriukov. He now equips his plane with a superb rubber band - from the 1997 batch that is considered the best ever. Asked by this reporter what he's doing as he tinkers with his plane, the normally patient Mr. Andriukov snaps, 'Preparing for fly-off.' Mr. Andriukov is among five flyers who keep their planes aloft for at least five minutes. The next round is seven minutes, very difficult unless a plane catches a thermal. The stocky Mr. Andriukov takes a couple of deep breaths, like a champion weight lifter, before giving his plane a mighty heave. His plane climbs about 400 feet in the first four seconds, then begins a slower spiraling ascent. Several other competitors get their planes up almost as high, but the last competitor touches down in six minutes and 31 seconds. Mr. Andriukov's plane, meanwhile, is still making graceful circles hundreds of feet above a kitty litter factory when the timer goes off at 8-1/2 minutes, and the craft begins its descent.
"A broad smile splits Alex Andriukov's broad, sun-burned face. A few minutes later, he receives his reward: a bottle of champagne with $28 ($2 for each contestant) taped to it, and he pops it open. The second place finisher, Bob Tymchek, a long-time top flyer from Nipomo, California, briefly frets about tactical mistakes before joining in the camaraderie. But 'if I had to get beat,' he says, 'it's OK to get beat by Alex.'"



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DAWN PATROL

See schedule inside

NEXT CONTEST

Fall Kick Off
Sunday
September 19th

Webster Field
Eloy

Phoenix
MODEL AIRPLANE CLUB

Steve Riley
605 La Casa De Prasa Dr. S.E.
Rio Rancho, New Mexico 87124