



THE RAMS HORN

The Official Newsletter of the Rainbow Aero Modelers Society
Metro Milwaukee Area Franklin, WI Founded Nov. 6, 1980

AMA—Academy of Model Aeronautics Club #1264, Operating for Public Benefit, Milwaukee County RC Flying Field, S.70 & W. Oakwood Rd.

Next Meeting: Wednesday, August 6, 2008
WaterStone Savings Bank 6560 S. 27th Street, 7PM
(formerly Wauwatosa Savings Bank)

THE PRESIDENTS REPORT by *Tom Ryan*

Water did it again! Mother Nature did it to us again, rained on our Fly-In but, from that came good news too! The date July 12th is now ours for future fly in events and the AMA is now on record for us having sanctioned events at our field so, next year we'll have our date and a rain date fixed in stone.

In the last few weeks I've held meetings with officers and people directly involved with the Fly-In, reviewing what we need to do for next year's Fly-In, and discussing what should be done by who and when. I'll go over those findings at the next club meeting scheduled at the Bank on Wednesday August 6th at 7:00 P.M. No more meetings at the field this year.

Some people have asked why they were not invited to those meetings. Fact is, they were officer meetings and not club meetings, and dealt with event planning.

The August meeting will cover many areas including our September picnic, so I'd like to see you attend it. I scheduled the meetings for July and August at the field to bring as many people in who can't attend the night meetings in hopes of having them involved in club business. But many who said they' would attend did not, so its back to our regular

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meetings at the Bank on the first Wednesday of every month.

Perks! What perks are there by being a RAMS Club Member as opposed to just having a field license? Well, at the August meeting you'll learn of what's being proposed, and why being a RAMS Club Member has special perks. So please attend. Your input will be of value to the membership as a whole.

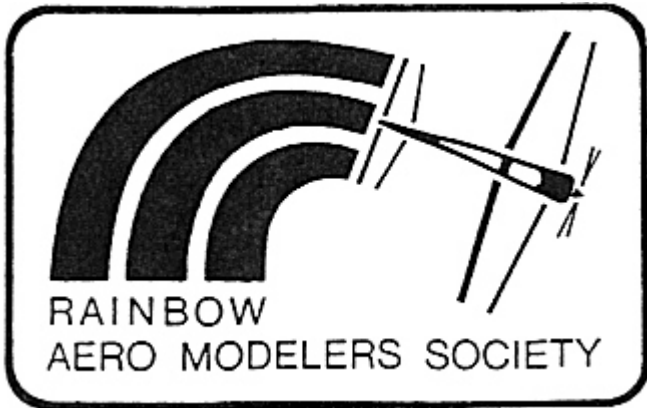
The field is terrific. It's a real pleasures to come out and fly, meet with friends and just enjoy the whole flying experience. I can't ever remember when it looked better or I saw more happy flyers. The only complaint I hear these days is about the weather, but then if we didn't have that complaint, we wouldn't have anything to complain about!

The field is better because of you, the members. Together we've become stronger, and more resilient. The recovery work after the flood proved that. SWARM was there in force and helped, too. Their membership and ours worked as a team and it showed. We bounced back and were back flying quickly, - a real team effort.

The goal now is to continue to make the field better, increase membership,& host more fun events. The more involved we get the membership, the bet-ter everything becomes for everyone. Believe me, your voice is heard, and it does make a difference!

Hope to see you at the meeting. Take Care, Tom

Pilot Profile This Issue: Jim Strelitzer



Founded Nov 6, 1980 Club #1264 Academy of Model Aeronautics

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MEETINGS-7PM

First Wednesdays
*WaterStone Sav.Bk
6560 S. 27 Street

Membership Dues
are \$15 per year;
except \$7.50 /year
for ages under 18,
or disabled.

Dues paid after
April 1. add \$1.00
Dues paid after
May 1, add \$2.00
Membership ends
June 1 if not paid

Terms of Office
and Dues Year
Mar. 1 - Feb. 28

Milw. County
RC Flying Site
Operated by the
RAMS Club is
Oakwood Rd. at
S. 70 th Street
in Franklin

Pilot License to
Fly at Milwaukee
County Field \$40
\$15 under age 18

**All Flight
Instruction
is
Without a Fee**

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*Retiring March, 2008–Will You take their place?

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Russ Schneider, SWARM instructor coordinator, 262-642-2790



“Great landing approach, Greely,
however, you’re
still making one
small error.”

Courtesy the Sooland R/C Smoke Signals
Sioux City, Iowa
Bernie DeBoer, Editor

Keith Kittoe
President

RCSLOT

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Happenings at the Meeting

RAMS Club, June 28, 2008 (At the Field)

by Russell Knetzger, Librarian & Editor

The July meeting was planned to be a Saturday-at-the-field to accommodate pilots, such as 2nd shift workers, who can't make our regular 1st Wednesday evening meetings. The first Saturday in July being the 5th, to avoid the July 4th weekend, June 28th was chosen. Attendance at the 50 minute July-in-June meeting was decent, with 30 pilots on hand, compared to 36 on June 4th. The club has 65 members, with Dell Fisher, of Butler, our latest.

Field license administrator Jim Hatzenbeller's report in earlier June was 103 licenses. Newsletters by email are now in full swing for 55 of our members, with erroneous addresses believed to be fully corrected. Current and 4 back issues may be read "on-line" courtesy of Keith Kittoe, owner of the on-line "RCSLOT" hobby shop near our field. All 37 Pilot Profiles published to date may also be found there. Find these materials by visiting:

rcslot.com/rams

Field manager Bob Kabella, reported the field edges are still wet from the flooding of June 7,8-9, but the rest is being regularly cut and rolled. A vote was taken whether to proceed with the July 12th AMA sanctioned Fly-In, and the vote was "yes." The meeting then went over planning details for the event, not reported here because July 11th rains forced its cancellation (see president's column, p.1.)

Completing the west runway extension is OK in concept with the City of Franklin engineering dept., by moving our own soil around, subject to our submitting actual grading plans Russell Knetzger was asked to get clarification on the 10 cubic yards of trucked-in fill allowed in the city letter. [The answer is the 10 yds. is a one-time-only allowance. All other leveling or field expansion has to be with soils already on the site. That ruling means returning to the way in 1987 the north south runway was built – using a professional grading contractor to collect soil from the creek spoil using a "paddle wheel" type earth scraper, suited to our high water table soils. Once deposited where needed, a road grader would tamp and smooth. By the August meeting it is hoped D.K. Contractors of Kenosha, WI will have a cost estimate ready for us. They have such a scraper. Our 1987 firm, Edgerton Contractors, no longer has such a unit.

Models at the Meeting

June 28, 2008 (At the Field)



Above: Hidden in the shade of his hat is Rich Kegel showing a Bronco OV10 ARF by Netco Models with 48" wing span, twin OS .15 engines, controlled by 9 servos, colored by Testor's model paint, fuel proofed with clear overcoat..



Above: Marv Anderson with his Hangar 9 ARF of a US Navy Hellcat, 76" wing span, 12 lbs., ASP engine, retractable landing gear. (Above photos by Keith Kittoe of RCSLOT)

Correction to last issue: the laser-leveling device for building straight or for finding warps, and held in place by magnets during measuring, costs \$39.95 plus shipping, not the \$19.95 last reported. It was shown by Marv Anderson.

July-in June Raffle winners: a field raffle was not held.

Reminder:

**This Saturday, August 2, 2008
is the Annual Astro Wings of Wisconsin
Giant Scale Fly-in
If you can, don't miss it
See last page for details, \$3 Car Park**

The Combat Corner

by Andy Runte, DVM (Dr. of Veterinary Medicine)
(aka "Dr. Kamakaze" RCCA #876, AMA 273119)

RAMS members Bill Geipel, Bryan Lorentzen, my dad Don Runte, and myself all went down to Muncie, IN to compete in the RC Combat National Championships (AMA NATS). My dad, who I'm still teaching to fly RC, went as my mechanic.

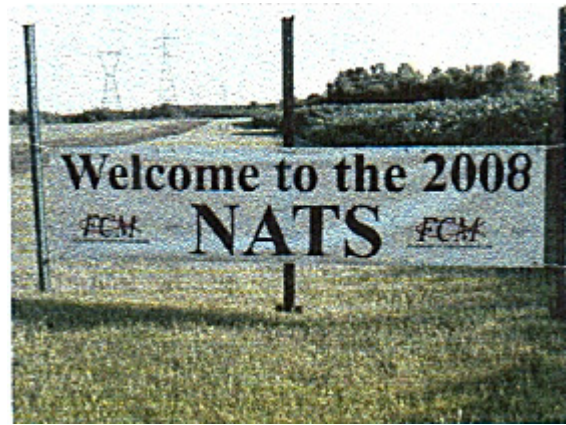
We arrived on Saturday July 12th. Our event was not to be flown until Sunday, so we just watched the other contestants finish flying in Open B (airplanes with .25 sized engines and similar airframes that we fly, but with tuned pipes and unlimited engine RPMs). The planes in Open B are extremely fast and maneuverable. The mid-air is much worse than in slow survivable combat (SSC) which is the class we fly with the .15 sized engines. Saturday night a storm rolled in while we were at the field. My dad and I made our way to the hotel through some very hard and driving rain, while Bryan and Bill hunkered down in Bill's camper at the field. One of the competitors actually got struck by lightning while taking down his awning on his camper during the storm! Luckily he was only left with a tingling in his arm and fingers, and a new nick-name, "SPARKY"!

We arrived at the field about 7:30 Sunday morning to get in a couple of test runs to tune the engines and tweak the planes with last minute trim adjustments. Tech inspection followed with getting all our planes weighed to make sure they weren't less than the 2-1/2 pound minimum, and able to pass all safety factors.

Six rounds were flown on Sunday and four on Monday. Twenty-six pilots competed in the event, which meant that each round had four heats with six or seven pilots flying in each heat. The weather on Sunday was in the lower eighties with increasing wind in the afternoon, probably approaching about 15 mph. Monday was about the same temperature but much calmer winds, probably not getting much over 10 mph.

Flying against the best of the best was quite intimidating. Bryan and I shared how while we were flying, our thumbs would be shaking from the adrenaline of competing at this level. All three of us flew very well. Bill placed 4th, averaging 331 points a round. I came in 6th, averaging 293 points, and Bryan got 16th with a 198 average. A good time was had by all!

During the times we were not competing, we enjoyed checking out the other competitions taking place at the AMA flying site. My dad and I watched pylon racing, control line stunt, control fine speed, control line rat race,



and control line combat. One evening Bill, my father, and myself, wearing our hard hats, walked down to the flight line where they were testing pylon racing and saw up close how they do things. It was very impressive how fast pylon racing planes travel...approaching 200 mph!

We also checked out the hobby store that is right on the grounds of the flying site and had another trip down memory lane in the museum. I had wanted to see the small airport which is right south of the flying site and my father and I went there as well. It is a neat little air-strip (formerly under contract for all flight instruction to Muncie's Ball State University's aeronautical program).

Until next time, "fly it like you stole it!"

RAMS at the Airport Museum

by Russell Knetzger, museum charter member, 1988

About a half dozen RAMS members were guests at the July 9, 2008 quarterly meeting of the "*Mitchell Gallery of Flight, Inc.*," which operates the museum at the north end of the main concourse. The topic was conversion of the Wis. Army National Guard's 832nd Medical Company (Air Ambulance) at West Bend, WI, from skid landing Huey's to wheeled Blackhawks. Unit commander Major Matt Strub spoke. He had extensive slides of unit Katrina rescues in New Orleans, and mountain rescues in Washington State.

Above: Former RAMS Editor and past Pres. Bill Stilley by



one of the museum displays of aircraft instruments he helps design at Astronautics, Inc., display sponsor.

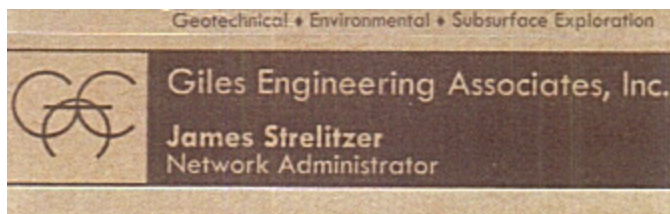
Pilot Profile: Jim Strelitzer

by Russell Knetzger

Jim, 48, is one of only three to hold a Life Member pilot's license at the Milwaukee County RC Model Airplane Field on Oakwood Rd. in Franklin. The field is operated for the County by the RAMS.

Life membership arose when the field bought, for \$12,000, our current diesel tractor, a Model 5030 Allis-Chalmers. That was in 1998. The Field Fund could not handle such an amount, so licenses were temporarily increased to \$65 a year for three years, but anyone paying \$450 in a lump sum got free licenses the rest of their life. The 1990's were an active decade in R/C for Jim and his wife Tami. Jim served as club secretary. Jim manned the grills and Tami sold food for many years at the annual RAMS Fly-In (ask him about the food inspector incident).

That extra club activity was possible because Jim worked not far from the field, on Howell Avenue and Ryan Rd., for an Environmental Analytical firm. While Jim has evolved to be the "computer guy" at Giles Engineering in Waukesha, he has a 1983 BS degree from UWM in Biological Aspects of Conservation. That qualified him to work for Chem-Bio, the Howell Av. firm. While there he analyzed water, soil, and industrial waste samples for metals using atomic absorption spectroscopy methods.



In working in a laboratory, Jim was following in his father's footsteps, a lab aide at Milwaukee County General Hospital, who passed away in 1994. Jim is a grad of Pius XI High School, at 76th near Blue Mound. Having built many models when he was younger, it was during the 5 years at Chem-Bio when Jim visited the RAMS field and decided to get into R/C. As with many students of his time Jim took flying lessons from Floyd Katz and remembers Ken Huber as a fellow student. Jim learned on a Royal 40T trainer with a Royal 0.46 engine.

The 1993 shift to the Waukesha job of itself did not cut into Jim's flying time, but what did was building a new home in Racine-Mt. Pleasant in 2003. Wife Tami works for Abbott Labs just across the Illinois line, as an Associate Scientist in development. To equalize job commute distances, they chose the Racine area.



Above: Jim Strelitzer, with his P-51 Mustang giant scale, 84 inch wing span, 23 lbs., 1,245 sq. in. wing area, powered by a Desert Air DA-50. Done in WW II Tuskegee Airman colors: red spinner & tail feathers. Jim's pilot even has brown skin, and Jim has conversed with the WW-II pilot (2nd Lt. George E. Hardy), now retired in Florida.

The move-up to giant scale was fostered by a \$500 10-Year Anniversary recognition from Giles Engineering in 2003. In his fleet of giant scalars, Jim also has a 1/3 scale Pitts Special with a Fuji 50 and a 103" span Extra 300 with a Desert Air DA-100.



Above: Close-up photo of access doors to fueler, air supply for pneumatic retracts, and on-off switches. Engine exhaust stacks are operational via custom exhaust by Keleo Creations. Graphics by Cal-Grafx.

RAMS HORN, August, 2008, Russell Knetzger, Editor
Rainbow Aero Modelers Society, Franklin, Wisconsin

Electric Flight News - VIII

By Dennis Vollrath, Editor, "The Flightline" –April, 2008
Racine R/C Club, Inc., Racine, Wisconsin – Reprinted in the
RAMS HORN, Russell Knetzger, Editor, Franklin, WI

More on High Power Electrics (continued)

Last issue, we discussed the ModelCalc program that is very useful for determining what will work with these electric models. This program will generate a considerable amount of information on your model setup. Let us take a look at it.

First, I entered in the motor (Hacker): motor model (A50-16S); propeller (16-12 APC-E); Model: wingspan; wing area; weight without motor and battery; Battery Mfg. and model; ESC brand and amp rating. From these inputs, ModelCalc generated the table on the next page. Only part of the table is shown, the table goes down to 55 miles per hour.

Note on the top of this printout, the program top line shows the information on the Hacker motor, the second line shows the battery info, third line shows the ESC control, fourth line shows the prop, fifth line the airframe and bottom line predictions on how this thing will fly. **Note:** all you enter on the Hacker motor is the brand name Hacker, and model type, A50-16S. ModelCalc generates everything else.

Lets look at the Stats line. ModelCalc shows 114 watts per pound of model weight input, and 99 watts per pound of model weight output. This is a direct indication of the efficiency of the motor, running at 99 divided by 114 or 86 percent My Astro 40 Geared motor runs at about 70%, a significant lower efficiency rating. The difference is heat, and a lot of it.

(Personal opinion on some of the Brushless Geared motors. They do put out a LOT of power for their size. However, some of these setups run the gear box without protection against foreign objects such as grass and worse. In my opinion, they must be shielded from foreign material My original Astro gearboxes and shafts were made from steel. They have changed to brass/aluminum on the brushless motors. Even though the geared motors perform very well, my opinion is, the best way to go is the outrunner motors that can directly drive the prop without a gear box These outrunners run a much higher efficiency, since the gear box introduces power losses of their own. Plus, even the best outrunners are much less expensive than a motor/gear box combination.)

Next, this program indicates that the model will stall at about 22 miles per hour with the optimum flying speed of 31 miles per hour for getting the longest flight time out of the battery. One of the more important parts of

the stats line is the 2201 ft/min at 53.6 degrees. This indicates that this model will climb up at 2200 feet per minute at an angle of 53 degrees.

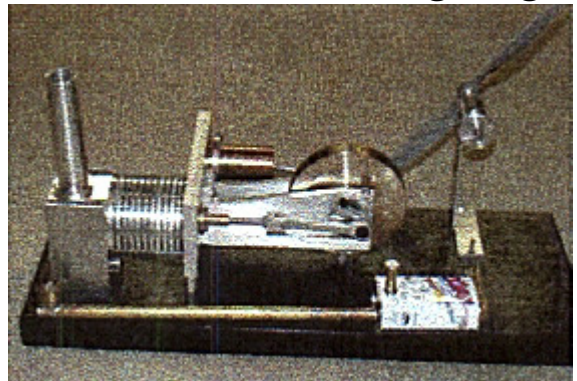
Now, let's look at the far left column of the printout. This shows the model speed in miles per hour. Next column is the models drag in ounces at various speeds, model wing lift, battery amps, motor amps (when changing throttle setting), battery volts, input watts, output watts, various efficiencies, Prop RPK prop thrust, Pitch Speed, more efficiencies, and flight time in seconds.

This graph is shown at full throttle on the motor. The program allows you to reduce the throttle setting of the motor, which re-draws all the printout information.

Probably the most important part of this printout is the 99 watts per pound output, climb rate of 2201 feet per minute and the pitch speed of the prop. The pitch speed of the prop while the model is on the ground is 67.4 miles per hour. That is about 3 times the stalling speed of the model, a value that is about right. This program also has an opinions printout that will give an opinion on how this model will fly, based on the above printouts.

[See MotoCalc electric flight print-out next page]

Vollrath's Model Sterling Engine



Dennis Vollrath, author of the series on *Electric Flight*, and of the series on *How Our Radio Systems Work*, has made a working model version of a Sterling engine. It is a type of engine most people (except mechanical engineers) have never heard about. He made it in 2 months on a Craftsman 1950s era 12" metal lathe, and a much modified Sherline mill. Invented in 1820 to pump water from the mines of England, it was powered by wood or coal fires, and cooled by some of the water it pumped. It is an external combustion engine, and was doing useful work long before steam engines or internal combustion engines were developed. Dennis' version turns a 12x8" propeller at 1600 rpm. It is fired by an alcohol burner and develops about 5 watts of power.

Motor: Hacker A50 16S; 360rpm/V; 2A no-load; 0.026 Ohms.

Battery: A123 ANR26550 M1 (30C); 6 series x 2 parallel cells; 2300mAh @ 3.3V; 0.016 Ohms/cell.

Speed Control: Castle Creations Phoenix 45; 0.0026 Ohms. High rate.

Drive System: Hanger 9 Props 16 inch; 16x12 (Pconst=1.17; Tconst=1) direct drive.

Airframe: Showtime ARF; 722sq in; 119.7oz RTF; 23.9oz/sq ft; Cd=0.058; Cl=0.46; Clopt=0.65; Clmax=1.24.

Stats: 114 W/lb in; 99 W/lb out; 22mph stall; 31mph opt @ 48% (52:33, 83°F); 37mph level @ 54% (43:52, 87°F); 2201ft/min @ 53.6°; -309ft/min @ -6.5°.

Table for Electric Flight News VIII

More on High Power Electrics, (continued)

by Dennis Vollrath, Editor, "The Flightline" - April, 2008

Racine R/C Club, Inc., Racine, Wisconsin - Reprinted in the

RAMS HORN, Russell Kneztger, Editor, Franklin, WI

AirSpd (mph)	Drag (oz)	Lift (oz)	Batt Amps	Motor Amps	Motor Volts	Input (W)	Loss (W)	MGbOut (W)	Hot.Gb Ef (%)	Shaft Ef (%)	Prop RPM	Thrust (oz)	PSPd (mph)	Prop Ef (%)	Total Ef (%)	Time (m:s)
0.0	0.0	0.0	49.4	49.4	17.3	854.4	115.2	739.2	86.5	75.6	5928	133.5	66.4	2.2	1.7	5:35
1.0	0.0	0.4	49.4	49.4	17.3	854.4	115.2	739.2	86.5	75.6	5928	132.5	65.4	4.4	3.4	5:35
2.0	0.1	0.8	49.4	49.4	17.3	854.6	115.2	739.3	86.5	75.6	5928	131.6	64.4	6.6	5.0	5:35
3.0	0.2	1.4	49.4	49.4	17.3	855.0	115.4	739.6	86.5	75.6	5927	130.6	63.3	8.8	6.6	5:35
4.0	0.3	2.2	49.5	49.5	17.3	855.5	115.5	740.0	86.5	75.6	5925	129.7	62.3	10.9	8.2	5:35
5.0	0.4	3.2	49.5	49.5	17.3	856.0	115.6	740.4	86.5	75.6	5924	128.8	61.3	12.9	9.8	5:35
6.0	0.5	4.3	49.5	49.5	17.3	856.6	115.8	740.8	86.5	75.5	5922	127.9	60.3	15.0	11.3	5:34
7.0	0.7	5.6	49.6	49.6	17.3	857.3	116.0	741.3	86.5	75.5	5920	127.1	59.3	17.0	12.8	5:34
8.0	0.9	7.1	49.6	49.6	17.3	858.0	116.2	741.8	86.5	75.5	5918	126.2	58.3	19.0	14.3	5:34
9.0	1.1	8.8	49.7	49.7	17.3	858.8	116.4	742.4	86.4	75.5	5917	125.3	57.2	20.9	15.8	5:33
10.0	1.3	10.7	49.7	49.7	17.3	859.6	116.6	742.9	86.4	75.4	5914	124.4	56.2	22.8	17.2	5:33
11.0	1.6	12.7	49.8	49.8	17.3	860.4	116.8	743.5	86.4	75.4	5912	123.6	55.2	24.7	18.7	5:33
12.0	1.9	14.9	49.8	49.8	17.3	861.2	117.1	744.1	86.4	75.4	5910	122.7	54.2	26.6	20.0	5:32
13.0	2.2	17.3	49.9	49.9	17.3	862.0	117.3	744.7	86.4	75.4	5908	121.8	53.1	28.4	21.4	5:32
14.0	2.5	19.8	49.9	49.9	17.3	862.7	117.5	745.2	86.4	75.4	5906	120.9	52.1	30.2	22.7	5:32
15.0	2.8	22.6	50.0	50.0	17.3	863.5	117.7	745.8	86.4	75.3	5904	120.0	51.1	31.9	24.1	5:31
16.0	3.2	25.5	50.1	50.1	17.3	864.2	117.9	746.3	86.4	75.3	5902	119.1	50.1	33.6	25.3	5:31
17.0	3.6	28.6	50.1	50.1	17.3	864.9	118.1	746.8	86.3	75.3	5900	118.2	49.1	35.3	26.6	5:31
18.0	4.0	31.8	50.1	50.1	17.3	865.5	118.3	747.2	86.3	75.3	5899	117.3	48.0	37.0	27.8	5:30
19.0	4.4	35.3	50.2	50.2	17.3	866.1	118.5	747.6	86.3	75.3	5897	116.4	47.0	38.6	29.0	5:30
20.0	4.8	38.9	50.2	50.2	17.3	866.6	118.6	748.0	86.3	75.2	5896	115.4	46.0	40.2	30.2	5:30
21.0	5.3	42.7	50.2	50.2	17.3	867.0	118.7	748.2	86.3	75.2	5895	114.5	45.0	41.7	31.4	5:30
22.0	5.8	46.6	50.3	50.3	17.3	867.2	118.8	748.4	86.3	75.2	5894	113.5	44.0	43.2	32.5	5:30
23.0	6.3	50.8	50.3	50.3	17.3	867.4	118.8	748.6	86.3	75.2	5893	112.5	43.0	44.7	33.6	5:29
24.0	6.9	55.1	50.3	50.3	17.3	867.5	118.9	748.6	86.3	75.2	5893	111.5	42.0	46.2	34.7	5:29

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About Our Radio Systems,XII-XIII

by Dennis Vollrath, Editor, "The Flightline"–Feb.-Mar.2008
Racine R/C Club, Inc., Racine, Wisconsin – Reprinted in the
RAMS HORN, Russell Knetzger, Editor, Franklin, WI

How It Works:The Superhetrodyne Receiver-Part1

Last issue we talked about "mixing radio frequencies" similar to what happens when you hear two model engines on a twin airplane being synchronized. That process results in a "beat frequency" that is hard to describe, but obvious to anyone that has listened to it.

The same exact thing happens in our receivers, as well as our AM-FM Radios, Cell Phones, Televisions, just about anything involving radio frequency. Now, for how it involves our RC receivers. (This is going to get pretty messy!)

We left off last issue with the IF frequency of 0.455 Mhz,or 455 Kilohertz. Lets use a typical radio for the following "How It Works". We can select channel 12, which transmits on 72.03 Mhz,r 72,030,000 Hertz (cycles per second.) We require a "Mixing Frequency" of 72,030,000 PLUS 455,000 Hertz or 72,030,000 MINUS 455,000 Hertz for the local oscillator. Different receivers use either the "plus" or "minus" for the other mixing frequency, which is why you should never mix crystals between radio brands. So, lets select the higher frequency which will be 72,030,000 PLUS 455,000, or 72,485,000 Hertz. The mixing process generates frequencies of 72,030,000, 72,485,000, 144,515,000 and 455,000 Hertz. This whole thing then gets sent to the Intermediate Amplifier, also known as the IF amplifier. The IF amplifier responds only to 455,000 Hertz, and rejects the other three frequencies. This all works very good. But, there is a very big fly in the ointment!

Now, lets suppose some paging frequency (or what ever?) is transmitting near by on 72,940,000 Hertz. Lets see, we mix this with the receiver's local oscillator of 72,485,000 and we get outputs of 72,940,000, 72,485,000 Hertz, 145,425,000 Hertz. Bia the last frequency is 72,940,000 Hertz minus 72,485,000 Hertz That's 455,000 Hertz!!!

That's the f_{IF} IF Frequency! We just found out that our receiver responds to two different frequencies, 72,030,000 Hertz, AND 72,940,000 Hertz. The only thing in the receiver that can separate the two frequencies

is the Radio Frequency (RF) Amplifier, and that RF Amp is not narrow band enough to do it. This in a nutshell is what is called the Image Frequency, and our receivers must have excellent Image Frequency rejection to work in the real world.

This article just described what is known as a single conversion receiver. We will cover the double conversion receiver in the next Part.

How it works:The Superhetrodyne Receiver-Part 2

Last Part, we left off with a description of the single conversion Superhet Receiver. This type of design uses one conversion directly from the 72 Mhz frequency transmitted to a 0.455 Mhz (455 Kilohertz) frequency where much of the amplification takes place. We showed that this type of receiver is subject to "Image Frequencies".

Now, what if we converted the 72 Mhz frequency TWICE??. Let see, first lets convert the 72 Mhz frequency to a much higher frequency than 0.455 Mhz, say 10.7 Mhz. It so happens that 10.7 Mhz is a very common frequency that is used throughout the radio industry, both in RC radio systems, ham radios, AM-FM radios and a lot of other stuff.

Let see, if we convert the 72 Mhz frequency to 10.7 Mhz, the image frequency would be some 50 Mhz significantly lower than the 72 Mhz frequency from our transmitters. This difference is much easier to reject by the receiver's Radio Frequency amplifier. This 10.7 Mhz first intermediate frequency is again down-converted to 0.455 Mhz by a second intermediate frequency conversion. The second intermediate frequency is where the majority of the "fine tuning" for our 5000 Hertz frequency bandwidth takes place.

Now, we have three crystals in our receiver. The first tunes in the 72 MHz frequency, the second tunes in the 10.7 Mhz frequency, the third tunes in the 0.455 Mhz frequency. Then again, many receiver designs may use ceramic filters in place of the radio frequency transformers that were used years ago. As previously mentioned, these crystals are more subject to vibration than most other parts in the receiver. That is a major reason that a receiver should NEVER be mounted non-isolated to the fuselage by Velcro, etc. in any model powered by a reciprocating engine.

Next, we will cover the remaining circuits in our receiver, such as the ring counter, automatic gain controls and so on.

Understanding Engineers

Submitted by Craig Manka, RAMS Secty.-Treas., 2008
From Barbara Magnuson via Jason Arnold

Understanding Engineers – One

Two engineering students were walking across a university campus when one said, "where did you get such a great bike?" The second engineer replied, "Well, I was walking alone yesterday minding my own business, when a beautiful woman rode up on this bike, threw it to the ground, took off all her clothes and said, "Take what you want." The first engineer nodded approvingly and said, "Good choice; the clothes probably would not have fityou anyway."

Understanding Engineers - Two

To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the engineer, the glass is twice as big as it needs to be.

Understanding Engineers - Three

A priest, a doctor, and an engineer were waiting one morning for a particularly slow group of golfers. The engineer fumed "What's with those guys.? We must have been waiting for fifteen minutes!" The doctor chimed in, "I don't know, but I've never seen such inept golf !" The priest said, "Here comes the greens-keeper. Let's have a word with him." He said, "Hello George, what's wrong with that group ahead of us? They're rather slow, aren't they?" -The greens keeper replied, "Oh, yes, - that's a group of blind firemen. They lost their sight saving our clubhouse from a fire last year, so we always let them play for free, anytime." The group fell silent for a moment. The priest said, "That's so sad. I think I will say a special prayer for them tonight." The doctor said, "Good idea. And I'm going to contact my ophthalmologist colleague and see if there's anything he can do for them The engineer said, "Why can't they play at night?"

Understanding Engineers – Four

What is the difference between mechanical engineers and civil engineers? Mechanical engineers build weapons and civil engineers build targets.

Understanding Engineers - Five

The graduate with a science degree asks, "Why does it work?" The graduate with an engineering degree asks, "How does it work?" The graduate with an accounting degree asks, "How much will it cost?" The graduate with an arts degree asks, "Do you want fries with that?"

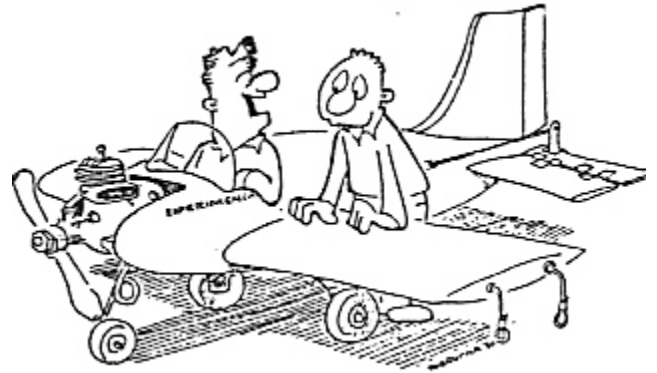
Understanding Engineers - Six

Three engineering students were gathered together discussing who must have designed the human body. One said,

"It was a mechanical engineer, just look at all the joints." Another said, "No, it was an electrical engineer. The nervous system has many thousands of electrical connections." The last one said, "No, actually it had to have been a civil engineer. Who else would run a toxic waste pipeline through a recreational area?"

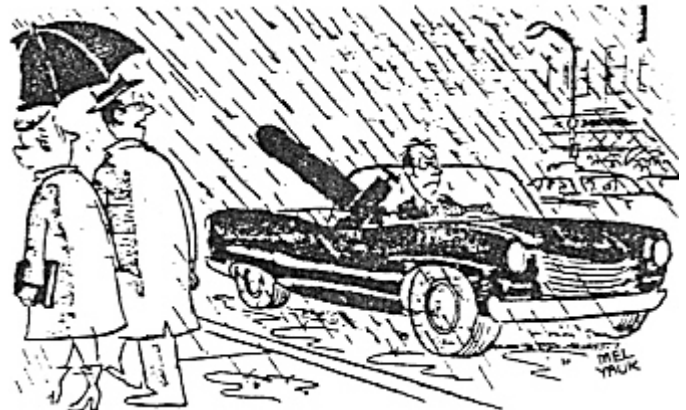
Understanding Engineers - Seven

Normal people believe that if it ain't broke, don't fix it. Engineers believe that if it ain't broke, it doesn't have enough features yet.



"It's my first homebuilt, but I've had lots of experience with models."

Courtesy of TAKE-OFF, Chris Joiner, Editor
Newsletter of the Columbus-Ft. Benning
RC Flyers Association



"Say, isn't that Channel 2's Weatherman?"

From the GLOW PLUG, Middle Tennessee
R/C Society, Phil McDowell, Editor

Upcoming Events - August

Wednesday, August 6, 2008 RAMS Club Meeting-7PM

Back at the Bank !

(WaterStone Savings Bank – Formerly Wauwatosa Savings Bank, - 6560 S. 27th Street, Oak Creek)

Tuesday, August 5, 2008 MARKS INVITATIONAL – RAMS, 7PM

Video: “Flight Deck” Carrier Operations, 48 min. by Aviation Week magazine (82nd & W. Forest Hill Ave.)

(A joint program for both clubs to bolster MARKS attendance)

(The July 1st program was Giant Scale slides of the 2007 Joe Nall Fly-In, May, 2007, South Carolina)

*** This Saturday, August 2, 2008 ASTRO WINGS Giant Scale Fly-In, Grafton, WI**

(A must-attend event for all area clubs. Raises \$5000 for Special Olympics of Wis.)

Scale Plane size and quality exceeds national events

(Take I-43 freeway to Grafton, exist to STH 32 just north of STH 60 exit, 1st driveway toward Port Washington)

Monday, July 28-Aug. 3, 2008, EAA KidVenture Volunteering (call Dave Sackerson at EAA)

(A satisfying volunteer opportunity. Assist control line flying. Free admission, meal & flight line for volunteering.)

Sunday, August 10, 2008 Flying Electrons Charity-Fly-In – Menomonee Falls

(Take Silver Spring to Pilgrim, N. to Kohler Lane, turn north at Water Tower)

Friday, Saturday & Sunday, Aug.15-16-17, Fond du Lac WI Scale Fly-In

(Take USH 41 to City limits, south on Hickory)

(Some of same unique quality scale planes as will be at Grafton, August 2nd)

Saturday & Sunday, August 23-24, 2008 MARKS Annual Float Fly

Bong Recreational, Kenosha County, WI

(Take I-94 south to STH 142 exit, west 9 miles to DNR gate. Must pay to enter unless DNR sticker)

(Shallow ponds are ideal depth, width, & length to fly waterborne aircraft)