

# THE CONNECTOR

The Official Newsletter of the Aeroguidance Society, Inc.

Endicott, New York



Editor: Gerry Skreckoski



THE CONNECTOR is the monthly newsletter of the Aeroguidance Society, Inc., Radio Control Model Club. The club owns and maintains its flying field in Endicott, N.Y. Anyone interested in joining the club should contact any of the officers listed below.

President: Wynn Aker                      Vice President: John Raney  
Secretary: George Kelsey              Treasurer: Jerry Bernhardt  
Board Member: Tom Kopl              Board Member: Terry Terrenoire II  
Past President: Chris Engler

VOLUME 25      ISSUE 6

JUNE, 1992

NEXT MEETING: June 16, 1992 - 8:00pm

Place: AGS Field

<u>AGS</u> <u>CALENDAR</u> <u>OF</u> <u>EVENTS</u>			
DATE	TIME	PLACE	EVENT
June 6,7	9:00am	Schenectady NY	Fun Fly
June 6,7	9:00am	Georgetown Ont. Can	Pattern Contest
June 16	8:00pm	AGS Field	AGS regular meeting
June 12,13,14	Variable	Sayre PA	37th Annual AGS Pattern Contest
June 20,21	9:00am	Kingston, Ont. Can	Fun Fly
June 21	9:00am	Pheonix NY	STARS Pylon racing
June 20,29	All day	Chicopee Mass.	66th AMA NATS
July 6	6:00pm	AGS Field	Pylon racing
July 11,12	9:00am	Olean Mun. Airport	STARS Scale Rally

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## PROGRAM FOR JUNE MEETING

Operating Field Mower ..... Farmer Brown

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NEXT CONNECTOR INPUT DEADLINE IS JULY 5 1992

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# PREZ SEZ

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by Wynn Aker

June, 1992

Starting this month, AGS regular meetings will be held at the club field, starting at 8:00 p.m. Bring an airplane, fly until eight, and participate in the meeting. The meeting will be held unless it is raining at the field. If may be raining elsewhere, but maybe not at the field. Also starting this month, you will likely see some trucks and loggers working on the north end of our property, near the Wittamore's property. We have entered into a contract with a logging crew, whereby they purchased our deadfall and scrub for use as firewood. Most of the wood they will be taking will be the leftover tops from last year's logger looking for building logs. These guys will not be using our main road; rather, they will come up from the north end. And lastly, the 37th Annual AGS Pattern Contest will be held this month, as you well know. If you can, make every effort to attend the contest and saturday night banquet. This year is guaranteed to be great!

If you do not have experience using the tractor at the field, please be sure to get some help from someone, and make certain to team up with a seasoned "mower" when it comes time for you to mow. We're a bit thin on mowing crews this summer; PLEASE SIGN UP FOR MOWING DETAIL!

ANNOUNCEMENT: The tentative date for the AGS summer picnic at the field is Sunday, August 2nd. Plans include some serious games for the "kid" in all of us, both airplane and non-airplane, with emphasis on family oriented activities. We're trying out some new ideas this year, and I'm really excited.

## REALLY TECHNICAL STUFF

When you install your servos and control horns, which servo arms and horns do you use? How much throw do you put in? How do you know which horns to use to get the recommended throws? What is exponential? Well, this month, we're going to get pretty technical, so if anyone is afraid, go get a beer and try to follow along. I'm doing this partly to show my high-school daughter that us old-timers had to learn mathematics, too!

Let's install an elevator on an Ultra-Sport 60. The instruction book recommends 5/8" throw up and down. First of all, start using metric. Throw away the english system, because 1/32" doesn't calculate well. So, 5/8" in millimeters is 16mm. We're also going to use a Futaba radio here, because that's all I have at home. A Futaba servo will traverse +/- 45 degrees of rotational movement at 100% throw (ATV). So, with a standard Conquest radio, or a computer radio with ATV's set at 100%, we now begin. There are essentially two basic choices for servo horns: the little round wheel that comes attached to a new servo (horn D), and the 4-arm horn (horn A). There is also a 6-arm horn (horn B), but it is the same as the 4-arm, except it's one hole shorter. You also get some other stuff, but for this article, that's all we really care about. The radii of the holes in these arms are as follows:

4-arm:	hole 1: 7.5mm	radius	small round:	inner:	7.5mm	radius
	hole 2: 10.5mm			outer:	8.25mm	
	hole 3: 13.5mm					
	hole 4: 16.5mm					

We're also going to need a control horn on the elevator. Let's use the Goldberg short control horn, since they're cheap, common, and come with most kits. It's hole distance, from the bottom of the horn is:

hole 1:	6mm	radius
hole 2:	9.75mm	
hole 3:	13.5mm	
hole 4:	17.25mm	

Now what we're going to do here, is convert the desired throw of the elevator into which control horn and which servo horn to use with 100% of servo throw. Why are we worried about 100% throw? Two reasons: One, if you don't have a computer radio, you will automatically get 100%; and, Two, it is very desirable to use the full range of the servo for throw, to minimize the effect of the the servo centering error (deadband). Servo deadband is the error built up by the ability of the servomotor system to reposition the arm in exactly the

same place every time. It doesn't, but it's pretty close. However, if you use only a small portion of the servo's throw, the finite deadband becomes a larger factor, as a percentage of the throw. So, we use as much throw as is available, to minimize the effect of the deadband. Did you get that? Oh, well. Anyway, we're using 100% of servo throw. So, we've looked at the plans for our Ultra Sport 60, and see that the depth of the elevator is 62mm and the thickness of the balsa used here is 3/8". Why is the thickness important? Because the top surface of the elevator, onto which we will attach the Goldberg control horn, is actually 1/2 the elevator thickness up from the hinge line. So, 1/2 of 3/8", in metric, is 4.762mm. Let's also calculate the angle traversed by our elevator moving up by 16mm (5/8"): That is the inverse tangent of 16mm/62mm, or  $\arctan(0.2561) = 14.5$  degrees. So, our elevator, and control horn both move 14.5 degrees for full up elevator deflection.

Now that we know all this junk, what do we do? Is anyone still reading this? Well, now we will match movement of a servo arm with movement of the elevator control horn. How will we accomplish this mighty feat, you ask? Did you even ask? Do you care? What we do now is calculate how far each servo hole moves for 100% throw (45 degrees) and how far each hole in the elevator control horn moves for our 14.5 degrees deflection. Simple! For the servo horns we take  $\cos(45) * \text{radius}$ , to get:

4-arm:	hole 1: 5.3mm throw	Small Round:	inner: 5.3mm throw	(gee! same as one on the 4-arm!)
	hole 2: 7.42mm		outer: 5.83mm	
	hole 3: 9.55mm			
	hole 4: 11.67mm			

We also calculate the linear movement of the control horn, but we need to recalculate the hole positions, since the horn is now offset from the hinge line by 1/2 the thickness of the elevator. Our new control horn positions become:

4.762 + 6	= 10.76mm radius	* $\sin(14.5)$	= 2.59mm throw
4.762 + 9.75	= 14.51mm radius	* $\sin(14.5)$	= 3.49mm throw
4.762 + 13.5	= 18.262mm radius	* $\sin(14.5)$	= 4.39mm throw
4.762 + 17.25	= 22.012mm radius	* $\sin(14.5)$	= 5.3mm throw

Does anybody notice a bunch of 5.3mm running around up there? It looks to me like if you use the outermost hole in the elevator control horn, which yields a movement of 5.3mm for full up deflection, then you have the option of using the inner hole of the small round horn, the 4-arm horn, and the 6-arm, all of which will give 5.3mm of throw! All this math stuff sure is neat, huh? Now, if you're like me, the recommended throws just ain't enough. Not by half! My flying tastes would go for more like about 3 or 4 times the recommended throw in this case, so I would use the 6-arm servo horn, to give myself plenty of options by playing with hole positions on both the servo and the elevator control horn. Did you get all this, John?

## EXPONENTIAL THROW

Did you know that you basically already have exponential throw in your radio? Even if you have the cheapest radio on the market, you have sort of an exponential throw. Trouble is, IT'S THE WRONG EXPONENTIAL! Have you ever felt that your controls were a little sensitive around the middle? It's not because you have high rates on, it's because the "slope" of the line is steeper near center stick than it is near full stick. Since the servos move in a circular direction, and your pushrod moves in a linear direction, you are converting rotational movement into linear movement at the end of the servo horn. What does this mean? Well, the conversion of rotational into linear motion produces a sine wave. A what? Yes, a sine wave. Have you noticed that as the servo reaches the end of its throw, the amount of throw becomes reduced? That's because the servo arm is reaching the point on the circle where it is starting to swing around to the other side of the servo, and producing less movement in the direction of the pushrod!

We can approximate the first 45 degrees of a sine wave with an exponential curve, and compensate with negative exponential throw in our computer radios. Since we know from the above exercise that the servos move +/- 45 degrees at the end of the 100% deflection, we have moved 45 degrees into the sine wave. That means that the slope of the line starts out steep, and then tapers off to reach the endpoint. It also means that we can calculate the value of the half-stick deflection with our sine wave, and also calculate a corresponding exponential throw value to program into our handy-dandy computer radios to offset this malady. Oh, no!, you say ... not more math! Yes! Isn't this fun! It follows that a half-stick deflection would be 1/2 of 45

degrees, or 22.5 degrees. So,  $\sin(22.5) = 0.3827$  divided by  $\sin(45) = 0.7071$  yields 0.5412 (normalized to 45 degrees). Therefore, our half-stick output should be 0.5, but is 0.5412; a little too high. How high, you ask? How do we know what exponential to use?

A little empirical exercise was called for. I hooked up a servo with a very long arm (6 inches) attached, and deflected the stick to the 22.5 degree point. This, by the way, was the only real hard part. I mean, how on earth do you hold a stick in exactly the same place for 5 minutes? My secret. Anyway, by having the stick deflected to exactly half, or 22.5 degrees, and then entering varying exponential values into the computer radio (Futaba 7UHFS), I made a table of the range of exponential curves available. By the way, Futaba Technical Customer Service was of absolutely no help here, whatsoever. These guys didn't even have a clue what the hell I was talking about. So, since  $1 - 0.5412 = 0.4588$ , we know our desired mid-point for the desired exponential curve, by interpolating the data points below:

0%	22.5 degrees midpoint
-20%	19.5 degrees
-40%	16 degrees
-60%	13 degrees
-80%	11 degrees
-100%	8 degrees

So, what's the magic answer? The calculations are Left To Student As Exercise, but it takes -12% exponential to offset the effects of the rotational motion of a servo translated into linear motion of the pushrod. There ... that was a bit like castor oil, now wasn't it? A little rough going down, but OH, so good for you! Stay tuned 'til next month, when we explore the effects of global warming on Monokote shrinkage!

\* I don't think much of a man who is not wiser today than he was yesterday. A. Lincoln

SLOW DOWN SLOW DOWN SLOW DOWN SLOW DOWN SLOW DOWN

## FROM THE EDITOR

We have excellent neighbors and an excellent road. the former because we have historically respected their wishes and the latter because the club spent some of your dues to have a contractor repair it. Driving your vehicle too fast will seriously damage both. Ten mph should be your limit. Around the turns, considerably slower. We have a fine flying field, lets not damage or lose it... \*\*\*

This year the Nationals are being held in our back yard, so to speak. Springfield MA area is not much more than a 1/2 day drive from here. For those who have never attended a NATS, this is an opportunity to see the scope of model aviation. It runs from 6/22 to 6/28 and all the events will be run during this period in the general location which has not been common in recent years. Indoor, free flight (rubber and engine power) CL (combat, carrier, scale speed and racing), and RC (soaring, choppers, scale, etc.) are happening during the week. If you haven't seen it it's worth some of your vacation time to do so. I went as an observer in '88 but did not see half of the events. But I liked it and entered RC sport scale in '90 in Indiana. I plan to fly scale again in '92. There probably will be 6-8 AGS members entered in various events this year and we have schedules of the events so that anyone interested could pick the most interesting event days. Its a great show.. \*\*\*

SLOW DOWN SLOW DOWN SLOW DOWN

# MEMBERSHIP MATTERS

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by Bob Noll, Membership Chairman

**New Associate Members:** Please join me in welcoming three new members into the club;

**Duane Smith** - RD 1 Box 76, Lisle 849-3894

Duane learned about the AGS at GJ's and joined the AGS for the companionship of fellow modelers and for flight instruction. His specific interests are scale aircraft of WWI and WWII as well as stand-off scale of the golden area. Duane's sponsors are Jerry Skreckoski and Dick Allen.

**Paul Goodrich** - 14 Halstead Ave., Owego 687-3031

Paul also learned about the AGS through GJ's and joined the AGS to learn to fly at a safe location. He has built a trainer and is getting ready to select a second plane to build. Jerry Bernhardt and Tim Rogers are his sponsors.

**Nathan Goodrich** - 14 Halstead Ave., Owego 687-3031

Nathan is the son of Paul and learned about the AGS from his father. He joined to develop new skill and have new experiences. Jerry Bernhardt and Tim Rogers are also his sponsors.

**Guests at the May Meeting:**

Don Rudy	Vestal
Jon Rudy	Vestal
Sean Wall	Endicott

**A reminder to sponsors:** Your duties as sponsors include;

- a) welcoming your member at meetings
- b) offering advice in building
- c) providing activities on club activities
- d) assistance in flight training
- e) staying in touch with the new member

I have been including sponsor assignments in each issue of the Connector. Also, the new member's phone number is included so you will give him a call and introduce yourselves and offer your assistance. Please make our new members feel good about joining the AGS through your personal interest in their success.

**Club Shirt and Jacket:** Don't forget to get your club shirt and jacket for the upcoming season.

SHIRT - light blue long or short sleeved with club patch on the back.

JACKET - dark blue coaches style with club patch on the back.

PATCH - embroidered emblem available from the Membership Chairman at club meetings or by other arrangements for a cost of \$6.00.

Get ready to look sharp for our club activities this season, especially when we host our annual pattern contest this month.

Bob Punkar has club hats which everyone working at the pattern contest should wear to be recognized as a club member and official of the contest.

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### 37th ANNUAL PATTERN CONTEST - by Bob Noll

This will be the last Connector before we host the biggest pattern contest in the Northeast on June 13 & 14 at the Blue Swan Airport in Sayre, PA. All committee chairman are ready, the trophies have been received, thousands of dollars worth of prizes are in my basement and final judges training sessions have taken place. Our crack registration team will start to register our contestants on Friday evening before the Judging Seminar which will take place under our Big Top at 7 PM. If you have not been assigned to a job (see May Connector) please give me a call (754-5279) as we always can use the help from anyone.

There is one important thing that I need to emphasize. The contest goes on in spite of bad weather so please be sure you are there to do your job even if the weather doesn't look flyable. Our contestants come a great distance and we must be ready for them. Flying starts at 9 AM on Saturday and continues until about 6 PM. On Sunday we start at 8 AM and finish up around 3 PM.

Many club members and contestants will be camping for the weekend at the airport. This is very convenient and a lot of fun, so you may want to consider this if you have a tent or camper. A Port-A-John will be available but there will be no hookups.

This year we will again hold our Saturday night bash indoors at the Sayre Elk's Club. I will have printed directions available at the contest. We will start with a cash bar at 7 PM followed by a buffet dinner. The buffet menu includes: choice of 2 meats, choice of potato, choice of macaroni, hot vegetable, tossed salad, rolls & butter, dessert, tea and coffee. Cost is \$5.00 to those who help at the contest and \$10.00 to all others. In addition to the buffet this year's special features will be an IFR Beer Pour and Karaoke. Wynn Aker is captain of our AGS team. Be there to cheer them on to victory.

One more important item Club members will be allowed to compete in the NOVICE class only. This is being done to provide the opportunity to those who would like to see what pattern competition is all about without having to travel very far. However, club members will not be charged an entry fee nor be eligible for any trophies or other prizes. This is due to the fact that we are using club judges and do not want to create a situation where we could be accused of showing partiality.

\* \* \* \* \*



**J U N E   B I R T H D A Y S**

6th Mark Lecher	17th Terry Terrenoire
9th Mike Pellicciotti	21st Steven Bard
9th Scott Anderson	30th Bob Frey
15th Bill Schenk	30th Herb Spicer

If there are any errors, please call me!!

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**E L E C T R I C   F L Y**

The Second annual Electric fly was a success by all measures. We had 16 registered pilots and approx 30 airplanes, including one twin and a four engine B-17; and the weather was perfect. We had 9 non-club members registered with one coming up from New Jersey. The word is going to be getting around this next year and 1993 should see substantial growth. All the flyers seemed to like the "free style" type of flying and informal atmosphere. We gave out nearly \$1000 worth of merchandise, spread out among all the pilots by drawing tickets, and everyone got 3 back issues of Model Airplane News.

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**H I G H   P O I N T**

A flyer receives 3 points for first, 2 for second, and 1 for third place in any AMA sanctioned event.

\*note, Ralph Jackson and Bob Noll are not on the list as they have achieved "ACE" status, and are no longer eligible.

Standings as of 6-1-92:

Wynn.....6	Scott.....3	Hai.....2
Terry.....6		

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**A M A   M U N C I E   G R A N D   O P E N I N G**

The weekend of June 13 and 14 will mark the Grand opening of the National Aeromodeling Center in Muncie Indiana. My daughter and I will be attending this event in two capacities. We will be manning a booth both days, and I will be attending several formal functions as an AVP.

We are planning to take lots of photos and will give you a full report here next month, but will have some things to say at the June 16th meeting at the field.

Vestal, New York 13850-0039  
P.O. Box 39  
Aeroguidance Society, Inc.

M O W I N G   L I S T

JUNE 20	OPEN OPEN	
June 27	J. Bernhaardt T. Braawn	754-3381
July 3	OPEN OPEN	
July 11	Win Aker Terry Terrenoire	785-6627 748-8146
July 18	George Kelsey Jerry Skreckoski	786-0223 625-4103

PLEASE NOTE!!!!!! WE HAVE SOME OPEN DAYS THIS MONTH. PLEASE SIGN UP!!

THE GRASS GROWS FAST IN JUNE, ESPECIALLY WITH ALL THE RECENT RAIN!!!