The AMA History Project Presents:
Biography of LEO WEISS

1919-1975 Started modeling in 1931

Transcribed by NR (09/2000); Edited by SS (2002), Reformatted by JS (02/2010)

Career:

- Designs were published in various publications including Zaic's Yearbook 1936 and 1937, Model Airplane News, Popular Aviation and Aeromodeller
- Received fifth place in scale competition at the 1933 Nationals
- 1974: Won third place in antique class at a Society of Antique Modelers (S.A.M.) Nationals

This biography was taken from the Hall of Fame application. The sponsor was John Pond that was dated July 22, 1975. Although Mr. Weiss is now deceased, he was still alive when the application was submitted.

Sponsorship Data – April 11, 1975

Name: Leo A. Weiss
Address: 89 Red Brook Road, Kings Point, NY 11024

Competitor

- 1931-1932: Scale model competitions, Old AMLA rules. Many first and second places in local contests.
- 1933 : Nationals Scale, fifth place
- 1934-1935: Various gas model contests, local and eastern states. Various high places.
- 1935: Nationals, Texaco Trophy winner.
- 1937: One of the few who entered the Detroit Nationals with a Radio Control (RC) airplane. (Ceased competitive flying after this until recently)
- 1974: Third place, Antique Class Society of Antique Modelers (SAM) Nationals (first competition in more than 35 years.)

Designs Published in Zaic's Yearbooks 1936 and 1937

- *Model Airplane News*, 1937
- *Popular Aviation*, 1938
- *Aeromodeller*, 1938

These covered several airplanes:

- 1935 Texaco Winner
- 1936 Texaco Model (Aristocrat)
- 1937 RC model and various other things RC systems, propellers, construction details, etc.

Experimenter

Either first in or largely responsible for the following:

- 1933: Planked construction, monocoque structures
- 1933: Identified section wing span construction
- 1933: Elliptical sections used for wing plan forms, fuselage cross sections, and the like
- 1933: Fully enclosed engines
- 1933: Low drag, high performance designs
- 1934: Mono-strut landing gears
- 1934: Stable Free Flight gas models; in this and foregoing blend of aerodynamic theory and advanced structural implementation
- 1935: Fully removable and quickly interchanged engine instaurations
- 1937: First reed-type multi-channel RC system
- 1936 -1937: Theoretical analyses; development of aerodynamic theory applicable to models
- 1939-1941: Development of advanced RC systems and aircraft, see section on industry

Leader

Clubs: Organizing member, Stuyvesant High School Club (New York City) 1932

ECSS/ NSS Director, Vice President, 1974-1975

Writer/Editor/Publisher

- 1932-1934: Editor, Stuyvesant High School "Flying Dutchman"
- 1935: Writer, contributor and representative of many for Junior Birdman – New York Journal –America; various
- 1936: Flying Aces magazine
- 1937: Model Airplane News magazine, "Building a Streamline Gas Model," a three-part article
- 1938: Popular Aviation, adjustable pitch propeller
- 1938: Aeromodeller magazine, multi-channel reed-modulated RC system
- 1938: National Aeronautics, RC
- 1940: "Design for Performance," Model Airplane News magazine, a three-part series
- 1974: Sailplane II Winch Tow Theory

Industry

1939 to 1941: Worked at Wright Field's Target and Torpedo Laboratory

- Refinement of reed systems
- Elimination of reeds, conversion to all electronic tone modulation/demodulation

- Refinement of catapult launch systems
- First use of stick control and refinements
- Simplified drone construction
- First use of symmetrical wing sections
- Rate gyro roll/yaw stabilization
- Application of RC to aircraft, boats, land vehicles, model to small full scale size (airplanes - 10 ft. to 25 ft. span)
- Early guided missile development; after this they quickly stopped being model airplanes

Other Information

During non-competitive years (1938 to 1973) a supporter of the activity financially and by way of example.

Leo Weiss wrote the following information in 1937.

The Future of Radio Controlled Models

Only five years ago, gasoline-powered model airplanes could hardly be considered as constituting a major or even a minor portion of the model building activities in the United States. The rapid rise in favor of gasoline-powered models is too well known by all those interested in model building to be touched upon here. However, gasoline-powered models are not without their intrinsic faults. Even now, a great fight is being raged against a certain group of people who contend than any aircraft, no matter what its size may be, that is flown without a pilot at the controls, constitutes a definite menace to safety.

We shall not here discuss the right or wrong of this argument. It suffices for us to not that no group of people, no matter who they may be, will go off half-cocked merely to cause trouble. If it is their contention that uncontrolled models are a menace (they do not specify mode of power) then let us go ahead and develop a form of control for models. They will have a tough one to bat down then.

Having established a definite need for control of model aircraft, let us study more closely what seems to be the outstanding method proposed for control. This, of course, is Radio Control. There are other methods such as mechanical devices, timers, etc. But these really give only half the result desired. Therefore, we shall confine our attentions henceforth solely to Radio Control.

Any system of radio control, no matter how basic in action it may be, requires the construction of an apparatus that will receive radio signals. It is not the purpose of this article to go into detail concerning the action of a radio receiver, since a general knowledge of the fundamentals of radio is a definite prerequisite for work in this field. Therefore, the more statement that a radio receiver is an absolute necessity, should give the prospective Radio Control experimenter no worries.

If the models are to be kept within a reasonable size, the weight of the radio receiver must be

rather low and, for this reason, rather short wavelengths should be used. It has been general practice, up to the present date, to use the five-meter band, this running from 58 to 61 megacycles in frequency. This matter of selection of wave band is subject to many variations, but since practically all of the little work we have done has been with five-meter radios, it would perhaps be best to stick to this for primary experiments.

With the receiver mapped out, some method of selecting controls to be operated must be designed. On most Radio Control outfits made so far, there was but one control, usually on the rudder. This system is the most basic one that we could visualize. Let us run through a brief description of the operation of such a system.

To begin with, a transmitter on the ground, at the desire of the operator, sends out a pure, unmodulated radio wave, of a frequency that is exactly tuned to that of the radio receiver in the model. By saving an unmodulated radio wave, it is merely implied that no frequency in the audible range has been impressed upon it. Receipt of this radio signal by the radio in the model will cause a drop in the plate current of the vacuum tube used in the radio receiver. This drop in plate current will cause a very sensitive relay to close, closing the necessary circuits for actuating the controls my means of a solenoid, an electric motor, rubber bands or some other means.

From the above description, it is immediately seen that only one control may be moved. To move more than one control, some method of selection must be accomplished. One method is known as the “dial selector system,” in which the action is almost identical with the elementary system just described. In this case, however, the relay does not move the controls directly, but actuates a solenoid, which gives rotary motion to a dial, on which there are a number of electrical contacts, each of which, upon coming in contact with a stationary contact, will move one control or another. The dial movement is controlled by a ratchet, so that with each closing of the sensitive relay, a new control is achieved.

Naturally, in the above system, the contacts must be arranged in a very definite sequence. Also, to go from one control to another, it may be necessary to pass momentarily through an undesired control. In both the single control and dial control systems, the relays, which act off the drop in plate current, must be sensitive to within one mil. This means .001 amperes.

If there is to be any future to Radio Control of models, such devices as have been described are entirely inadequate. A model with control only on the rudder is virtually uncontrolled. Simple mechanical devices will give just as effective results with a good deal less expense.

Since we are discussing the future of Radio Control as applied to model aircraft, let us visualize just what the ultimate in control systems will look like. We shall do this merely based on expected action of this mythical system. First, it will be possible to control four major parts of the airplane. These are rudder, ailerons, elevators and the motor. The control over the rudder, ailerons and elevators will be entirely unrelated, so that they may be moved separately or simultaneously. Also, it will be possible to regulate the degree of control for each of the above controls. The motor control will consist of regulating engine speed over what will probably be a

small range and also a motor cut-off control. Secondly, the size of this control system will be such that it may be used on the average sized gas model, being approximately eight-feet in wingspread. This limits the weight to about three pounds, and puts a rather indefinite limit on the size of the control system. Other characteristics of this Radio Control system of the future are as follows: very little time lag in getting the controls to operate, fairly long life of the batteries used in the receiver in the model.

But is there an actual need for a control system such as just described? What if one of the four prime controls are omitted? The answers lie with the individual model builder. The situation is much the same as building an indoor tractor that will do 18 minutes or one that will do 21. Radio Control may be accomplished with a degree of perfection corresponding to the personal desires of the builder and designer of the system.

It has always been the desire of this writer to build a Radio Control system that would function as closely as possible like a human pilot at the controls of a full-sized aircraft. Such an accomplishment cannot be realized without many years of work, and great expense, but consider the fruits of such a device! Visualize if you will a model taking off, flying, executing elementary maneuvers, and landing, all under the exact, precision control of a person the ground. More than this, picture not one of these models, but 10 or 20, competing in a contest. The elementary contests we have now, consisting primarily of uncontrolled duration flights, would be entirely outmoded. Contests of speed, aerobatics, weight lifting, and many others could be carried out in an ordinary manner. Fantastic? Many of us can remember the days when the thought of models powered with gasoline engines seemed usually implausible. Expensive? There are as many radio amateurs as model builders in the United States. Many of their “rigs” cost much more than our optimum method of Radio Control would cost.

Let us go into more detail concerning this matter of cost. Undoubtedly, this factor, with the possible exception of the lack of general knowledge of the subject, is the greatest influence retarding the growth of Radio Control experimentations. Probably your greatest source of worry will be the cost of batteries to be used for the radio receiver, relays and actuating controls. In general, about 90 volts is required for the plate supply. The standard B batteries for radio give 45 volts, and consequently two of these, wired in series, will give the required voltage. It is not good practice to use less than 90 volts for plate voltage. The Burgess Battery Co., of Freeport, Illinois, puts out two types of batteries, which might be used for Radio Control work. The author has used types WFOFL and WFOBP with excellent results. The National Carbo Co. also makes batteries that might be used, but it has been found in general that they are applicable only to smaller radios, requiring very low current drains. The cost of these batteries, as put out by both companies, is not at all excessive.

It is found, however, that supplying batteries for transmitter operation will run into money, although the batteries last for considerable time. A Vibropak power supply, run off the six volts of an automobile battery may be used in place of batteries. The total cost of batteries used on the author's Radio Control system as described in the October 1987 issue of Model Airplane News was $5. This price is subject to a price reduction of 40%, given to all licensed radio amateurs.

This brought the price down to $3. However, while the cost of batteries as actually used in operation may be quite small, it takes quite a bit of money to carry on experiments.

Other costs encountered in the construction of a Radio Control system are as follows: radio tubes, radio parts, such as condensers, resistors and many other small items, cost of special parts, which cannot be constructed at home.

Here is what you need if you intend to build a Radio Control system for model aircraft.\

1) An amateur radio license, or another radio amateur, with whom you can collaborate.
2) A very definite idea of what type of system you want. Here, there are three main classifications:
    a) Single control, un-modulated radio wave.
    b) Dial selector, similar in operation to a.
    c) Special selector, using mechanical selection, based on the principle of resonant reeds. (Described in Model Airplane News, October 1987)
3) A supply of $2 or $3 a week, to be used for experiments. Total cost should be about $75.
4) An automobile for carting all your equipment around.
5) As much time as you possibly can get to work on it.

If you feel that you are qualified, according to the requirements listed above, and have the sufficient incentive, there is no reason at all why you cannot go right ahead and build your Radio Control apparatus. Just what you should be striving for has been outlined. Perhaps you disagree. That is perfectly all right, for if you disagree, and work along your own lines for a year or two, you will perhaps succeed in developing a system even better than the optimum system here outlined.

On the other hand, if you feel that it is more worth your while to wait until the Radio Control systems are more fully developed, and then to copy them, you may cut down expenses, but you will not be learning anything. So it is, with some money in your pocket, a burning desire to accomplish something worthwhile, and enough pertinent information, you should be able to point yourself toward goal in Radio Control, and by dint of hard work, you will not be denied.

The following information on Leo Weiss ran in the Model Airplane News 1961 Annual.

If any one thing influenced the course of the adult life of Leo A. Weiss, president of Avien, Inc., it was his interest as a youngster in airplane model building.

Today, Mr. Weiss heads a multi-million dollar concern, which is recognized as a leading designer and manufacturer of instruments, controls and other electronic products and major systems for aerospace, undersea, and industrial use. And the initial impetus for his business success, Mr. Weiss feels, was provided by the interest generated in the flight field by his airplane modeling work.

The Avien president early exhibited an aptitude for model building. In fact, he became so

proficient at it that, in 1935, when he was 16, he was the winner of the Texaco Trophy, in the second year it was awarded.

Looking back on his model-building hobby, Mr. Weiss believes that this endeavor equipped him with four attributes, which have been especially valuable in the course of his adult business life. He describes these four factors as being “a background in technology, an increased sense of creativity, a sharpening of the competitive attitude, and a sense of independence.”

Expanding on the technology background factor, Mr. Weiss explains, “airplane model building introduced me at an early age to the basics of aerodynamics and sharpened my desire to learn more about the scientific phenomena surrounding flight. From this early orientation, it was only natural for me to pursue the study of science into my adult life.”

The increased sense of creativity generated by model building was described by Mr. Weiss in this manner, “In those early days of modeling, instructions for putting the planes together were not nearly as complete as today. Kids had to do a lot of designing, even when they were copying instructions. I used to continually find myself adding wrinkles to the basic design. In other words, I was sharpening my sense of creativity.”

Competition was also a factor that came into clear focus as a result of model building, Mr. Weiss feels. “Learning how to win and how to cope with losing are important in the development of any youngster. Model building helped me to learn these basic rules of living. And these lessons have been very important to me in my adult life, especially since Avien is in a highly competitive industry.”

Finally, but far from being least important, is the sense of independence that model building gave to the Avien president. “Every kid building model airplanes when I was a youngster was doing something rather unusual. It gave us a sense of freedom, of going away from the normal games that children used to play. In other words, it fostered a sense of independence in us.” Mr. Weiss explains, “This independent viewpoint toward thinking and acting is extremely essential in an industry like ours where the top premiums are paid for new ideas and concepts. Model building certainly helped me develop this independent attitude.”

Mr. Weiss founded Avien in 1948 to manufacture his patented concept of an electronic fuel quantity gauge system for aircraft. Today, he is president and chair of the board of the company.

Starting with the winning of a national award for building one of the nation’s first Radio Controlled (RC) model airplanes when he was a youngster, Mr. Weiss has ever since been deeply involved in the design and development of electronic control and measurement systems for aircraft, missiles, undersea devices and their attendant ground support equipment.

Now 41-years-old, he has been active in avionic electronics for almost half his life. At age 22 he was in charge of a 300-man division of Simmonds Accessories Inc. where he was primarily responsible for the first electronic fuel quantity gauge produced in this country for military and

commercial aircraft.

Within a few years after the founding of Avien, the company became the nation's prime supplier of fuel quantity systems to the armed forces. Today, while Avien remains a major designer and manufacturer of fuel management systems used on such aircraft as the B-58, B-52, and B-47, the company is also heavily involved in such missile programs as Atlas, Polaris, and Minuteman and is a pioneer in the field of undersea propulsion, detection systems and vehicles.

In addition to the parent company, Avien also has three subsidiaries. Colvin Laboratories Inc. and Pressure Elements Inc., both of East Orange, New Jersey, are engaged in the design and manufacture of electromechanical instrumentation for automated industrial applications and for aircraft, missile, and undersea devices. Trident Corporation of Cambridge, Massachusetts, carries out research and development in the area of undersea detection systems.

Mr. Weiss holds a number of patents on inventions in the fields of liquid measurement and control and the initial success of Avien was based on his various inventions and improvements of such equipment.

He is an associate fellow in the Institute of the Aeronautical Sciences; eastern area president of the Young Presidents organization; regional vice chairman for New York, Pennsylvania and Delaware and New York State finance chairman for the U.S. Committee for the United Nations; and, among other organizations, a member of the National Aeronautic Association, Wings Club, National Pilots Association, Society of Automotive Engineers and Aircraft Owners and Pilots Association.

Married, Mr. Weiss lives with his wife and three children in Kings Point, Long Island, New York.

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