



The AMA History Project Presents: Autobiography of FRANCIS DRAKE REYNOLDS



Experimenter, Model Builder, Magazine Column Writer

Born February 23, 1920

Modeler since 1936

AMA #9241

Written & Submitted by FR (05/1996); Transcribed by NR (06/1996); Edited by SS (2002), Updated by JS (10/2008), Reformatted by JS (01/2010)

Honors:

- 2001: Model Aviation Hall of Fame
-

The Reynolds' trophy shelves hold several dozen awards that Francis has won in many shows including "Best of Show" at the Boeing Employees Hobby Show in 1956 and "Best of Show" at the Northwest Model Exposition (Puyallup) in 1987.

He is a designer, experimenter and modeling writer.

He is an engineer and an inventor and he has made full use of his creative and technical skills in all of his modeling efforts.

His technical progress in modeling (and in the aerospace industry) has been, and is, his life's work.

His modeling is a serious science with him, not just a casual hobby. But he finds in it, joy, not work.

His outstanding contributions in the above areas continue undiminished in his retirement years.

He originated and has been writing the "Model Design & Technical Stuff" column in *Model Builder* every month since June 1988 – roughly 100 to date. In recent readers' surveys that *Model Builder* has conducted, his column was voted by far the most popular feature of the magazine.

It is suggested that those who are not familiar with Reynolds' work read several of his technical columns in *Model Builder*, in order to appreciate the value of his continuing contributions to modeling.

He is called upon by many hundreds of modelers for technical modeling information and advice, by both letter and phone. Francis Reynolds finds creating and designing models is fully as interesting as the building and the flying.

The following identifies his major personal modeling developments and the corresponding

articles that he wrote and had published. These projects are listed in chronological order of their development, but in some cases, their publication was later. Most of the articles listed were published prior to or in addition to his monthly column.

1. Development of a Magneto for model airplane engines. (Engineering Thesis, University of Washington. a) 1942 - First place in the American Society of Mechanical Engineers student technical competition. b) Nov. 1992 - June 1993: *Model Builder* magazine. Reynolds' magneto development preceded the commercial magnetos of Emil Vollenweider.

2. June 1946: *Air Trails*. "Model requirements for advanced Control Line Aerobatics." Prior to this article Control Line stunting was limited to inside loops. Francis worked out and presented the technical requirements for designing models, which could fly inverted and perform outside maneuvers. According to Charles Mackey, Control Line historian, Francis was the first to accomplish and demonstrate these maneuvers (prior to Jim Walker's stunting demonstrations).

3. World Champion (England, 1960): remote firefighting exact scale Radio Control fireboat. July 4, 1965: Seattle Times Pictorial Section and U.S. Boat of Summer 1991. The 20-channel control system for this model, invented by Reynolds and Leroy Perkins, was patented, sold to Boeing and was used on the BOMARC guided missile. The development of the system plus construction of the boat took 6,000 man hours over a span of nine years.

4. Fall: 1991 Published in *U.S. Boat*. Patented the Hydrocopter dynamic hydrofoil marine vehicle. Research and development conducted for full-scale vehicles through the use of Radio Control models. Work is continuing on this concept in Australia.

5. March 1970: *American Aircraft Modeler*. Radio Control Sport Scale model of Boeing's first airplane, the 1916 B&W Seaplane (Boeing News and American)

6. October 1989: *Model Builder*. Retracting float Radio Control floatplane. The twin floats retract upward and inward to form the sides of the fuselage. Seatract, a six-foot .60-powered Radio Control model was developed.

7. March 1989: *Model Builder*. Radio Control scale model of the 1910 Fabre Hydration canard seaplane with wing warping. This airplane was the world's first successful seaplane, getting off the water in France a year before Glenn Curtiss did in San Diego, Calif.

8. March and April 1985: *Model Builder*. "Gossamer Slowpoke." Studies and experiments with ultra-slow-flying Radio Control models.

9. December 1986: *Radio Control Modeler*. Radio Control Amphibians, which do not require retraction of the wheels on water. Reynolds' two developmental models made a hundred or more flights from land to water and back to land with no change in configuration for the water landings and takeoffs. The concept was later considered for full-scale ultralights.

10. July 1987: *Model Builder* and 1987 Puyallup – “Best-of-Show” at Northwest Model Expo. Sixteen-channel Radio Control, one tenth exact scale crawler Manitowoc 3900 crane. The model will lift 200 pounds (its true-scale capacity), and will do everything else the full-scale crane does. This was a 7,000-man-hour project including a year and a half of engineering prior to starting construction.

11. February 1991: *Model Builder*. Collaborated with Andy Bauer in the development of the Windmill sailing carts, which can go directly into the wind and go faster than the wind directly downwind with no auxiliary power. This design utilizes the basic principles of aerodynamics. Francis published this invention of Andy Bauer in *Model Builder*, February 1991, and in *Hot Rod Mechanix* magazine in July 1991. He contributed to the understanding of this remarkable but valid technical phenomenon.

12. October 1994: *Model Builder*. Walking humanoid robot Radio Control Robot, is quarter scale, all metal, appears to follow verbal orders, argues with his “master,” moves his head and eyes, picks up and carries things, placing them where commanded, skis and puts on a very popular show for all ages.

All of the above projects were successful, sometimes after many years of work. Francis is not an idle dreamer – his innovations always see development and final hardware form.

Current Project

Reynolds’ current project is a glow powered, 10-foot-span, advanced Radio Control ornithopter. It will be published in a 1996 *Model Builder* issue and the American Institute of Aeronautics and Astronautics Pacific Northwest Section Newsletter, spring 1996.

This will be the first ornithopter (of any size) with roll control for full 3-axis capability, and the first ornithopter with wing pitching and twisting through the use of mechanisms synchronized with the flapping cycles.

The research for this project required study of ornithopter theory for over a year and has been designing and constructing the mechanisms for a like period. First flight tests are about a year away.

In addition, Francis has developed or explored a number of other modeling improvements in his column, such as:

- The “slip off wing mount” which greatly reduces crash damage
- The mechanical methods of achieving exponential control with older or simpler radio systems
- The use of “wing cube loading” instead of wing loading to eliminate the size dependence of the latter
- The modification of servos for any desired travel or for use as reversible speed controlled motors
- And hot air balloons that can glide (both while descending and rising) for cross-country

travel independent of the wind

Reynolds' articles are always educational in nature, explaining, in a semi-technical but understandable manner, why things work (or don't work).

His column covers a broad range of theoretical and design-and-construction areas. The subjects are often applicable to more than one class of model airplane.

Francis also often ties model aircraft technology into full-scale aircraft technology, showing the importance of model work to the field of aeronautics.

He writes with humor, with authority when he is sure of his subject and with humility when he is still seeking answers himself.

He is an excellent teacher as well as a remarkably creative and prolific doer. He encourages personal thinking rather than passive acceptance or blind copying.

In spite of his 76 years, Francis does not fit the typical candidate molds that we have used as a benchmark of excellence. He is a:

- Modeler
- Engineer
- Inventor
- Writer and Author (*Model Builder* columnist)
- Teacher who takes us on a journey of imagination and creativity. His fertile mind will delve into any facet of model engineering and opens our minds to the wonder of the possibilities.

You will note that some of Reynolds' earlier projects were model boats. These were included to give some idea of the scope and productivity of this prolific modeler/engineer.

(signed) Francis Reynolds, 1996

This PDF is property of the Academy of Model Aeronautics. Permission must be granted by the AMA History Project for any reprint or duplication for public use.

AMA History Project
National Model Aviation Museum
5151 E. Memorial Dr.
Muncie IN 47302
(765) 287-1256, ext. 511
historyproject@modelaircraft.org

