

The two programs and what they are capable of. Since it is a simple plan, I didn't begin to approach the limits of the programs' capabilities. ModelCAD uses "automatic tiling," which allows you to print full-size plans from your home computer. If you look closely, you can see where the sheets of paper overlap.

# CAD

*...the easy way!*

by Tim Vandenhuevel

For some people, one of the major attractions of this hobby is that it gives them the ability to put their ideas to the test. Without an easy-to-use, convenient, and powerful computer-aided drafting (CAD) program, however, it can be very hard for you to put your ideas on paper. Upperspace Corporation has filled that need with their ModelCAD and Wingmaster programs. ModelCAD is a user-friendly, versatile CAD program that was designed with modeling of all types in mind. Wingmaster is an airfoil and wing design program that can be used either alone or to complement ModelCAD.

<b>PRODUCT:</b>	ModelCAD and Wingmaster
<b>MANUFACTURER:</b>	Upperspace
<b>SOFTWARE TYPE:</b>	ModelCAD - computer-aided drafting Wingmaster - wing and airfoil design
<b>SYSTEM REQUIREMENTS:</b>	Requirements are the same for both programs—Windows 95 or later, a 486DX processor, 16 MB of RAM, a Super VGA graphics card capable of 256 colors, and a Super VGA monitor capable of 800 x 600 resolution.
<b>SOFTWARE FORMAT:</b>	Available on 3.5-in. diskette or CD-ROM
<b>PRICE:</b>	\$99.95 + S&H
<b>DISTRIBUTOR:</b>	Upperspace 600 SE 49th Street Pryor, OK 74361 Phone: (800) 233-3223 Website: www.designcad.com

SPECIFICATIONS

## What You Get

The ModelCAD box contained the program on CD-ROM, a product registration program on CD-ROM, a product registration card, and an impressive 241-page reference manual. A program called ModelCalc is included in ModelCAD. ModelCalc predicts the performance of and calculates data for aircraft designs.

Wingmaster's box also included a CD-ROM and a product registration card. Unlike ModelCAD, Wingmaster does not come with a printed reference manual. Instead, instructions are included in the software in a HELP file. Both programs include free tech support, a feature that some other programs don't include.

## The Fun Part

Installing both programs was easy. The few short steps that you need to follow are printed on the CD-ROM. Once you place the CD-ROM in the drive, give the command to run the setup file. The setup file will walk you through the installation. You're done. Now, let's play!

To help familiarize myself with the program, I read through the manual for ModelCAD. WOW! It covered everything! To become even more familiar with the program, I decided to take advantage of the tutorial featured in the manual. It was very clear and easy to follow, and made me comfortable with the program.

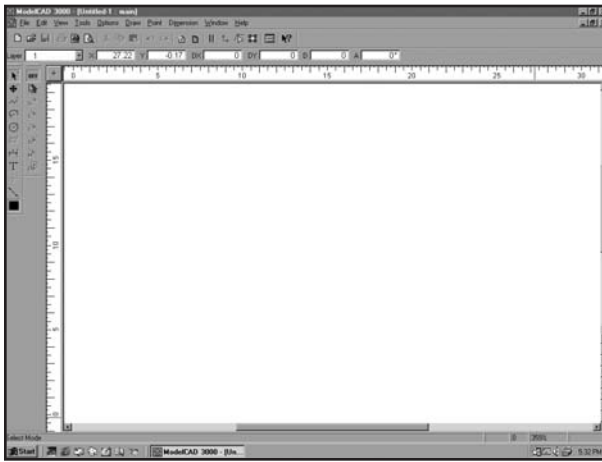
I used the two programs to design a basic airplane plan. ModelCAD was used to draw the fuselage and the tail feathers. The wing was designed on Wingmaster and then imported to ModelCAD. Because the two products are intended to be used together, any files generated by Wingmaster—including airfoils, ribs, and wing designs—can be imported by ModelCAD.

I started my design with the fuselage. Designing the fuselage using ModelCAD was as easy as drawing one of the sides, duplicating it, mirroring it, and finally placing it where I wanted. All of these functions are easily accessed by two or fewer keystrokes, or were found in the well-laid-out menus. Once the sides were in place, it was just a matter of adding the bulkheads and tail feathers.

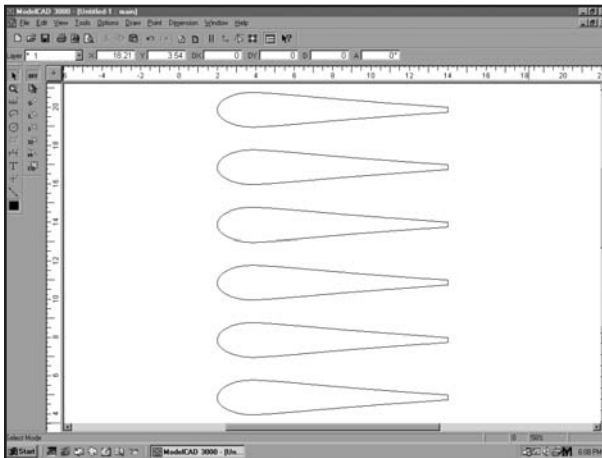
After a very short while, the time had come to label some parts of the plan. ModelCAD couldn't make adding text any easier. Pressing the letter "T" brings up the "Text" function, a small box that lets you select what text to add, the font, and the size. One click of the mouse places the text where you want it; a second click sets the angle at which it will be placed.

To modify any item already drawn, you can select one of the points in the item and move it around as desired. This keeps you from having to redraw the item. I took

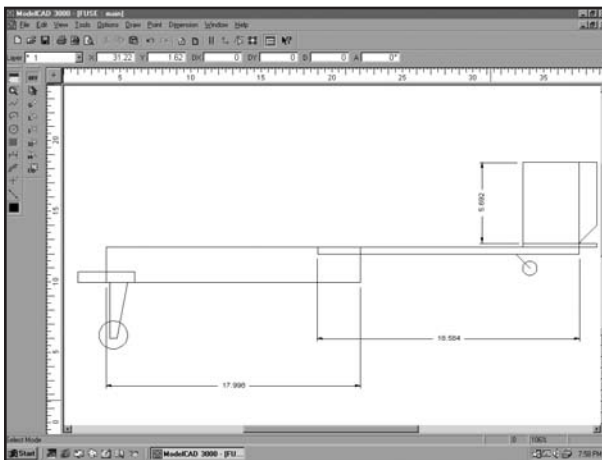
**ModelCAD's screen is well laid out. With lots of "toolboxes," it saves a lot of time and is easy to use.**



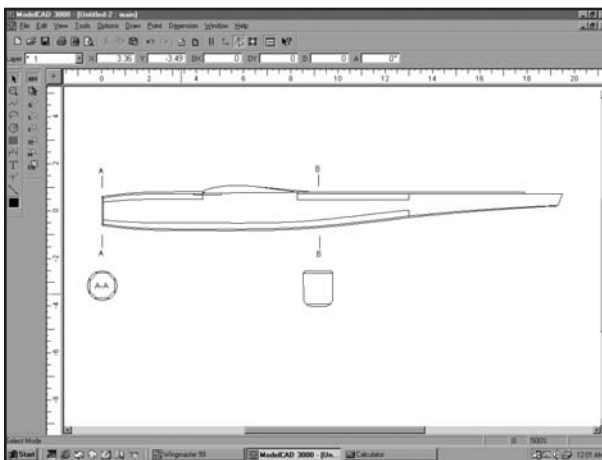
**Towards the end of the tutorial. It makes you feel confident and comfortable with the program.**



**Following the tutorial is very easy. The manual is well written and easy to follow.**



**Midway through the fuselage, which took a very short time to complete.**



advantage of this time-saver on numerous details.

When I opened Wingmaster to begin designing the airplane's wing, I was very surprised at how simple the program looked. Despite its very simple layout, however, it is capable of doing almost anything you could ask.

Wing design begins with airfoil selection. The program lets you choose separate airfoils for the wing tip and wing root. Wingmaster is bound to have the airfoil you are looking for. There are more than 400 airfoils already available, or you can design your own. Wingmaster allows you to design 4-, 5-, and 6-digit NACA airfoils. This program is very fun to play with, and its abilities are virtually limitless.

After selecting the airfoils, it's time to use the "Wing Design" function. This opens a large box from which the necessary parameters for the wing are input: the half wingspan, the wing-tip chord, and the wing-root chord. While adding the parameters, the program shows you the planform and provides you with the wing area. It also updates them as you change the parameters of the wing.

You can also set wing sweep. This feature makes it possible to determine the sweep using an angle or distance referenced from the leading edge (LE), trailing edge (TE), or the quarter chord (one quarter of the distance from the LE to the TE). Very handy!

One very impressive feature is the ability to produce elliptical planforms. Activate the "Elliptical Wing" function and Wingmaster transforms your wing into an elliptical planform. It also allows you to change the location of the tip radius. For example, moving the radius to the TE gives you an elliptical wing with a straight TE. Tough to explain, but easy to use!

Wingmaster also allows you to place wing ribs and a spar. All you have to do is determine the number of ribs, the size of the spar, and the location of the spar—Wingmaster takes care of the rest!

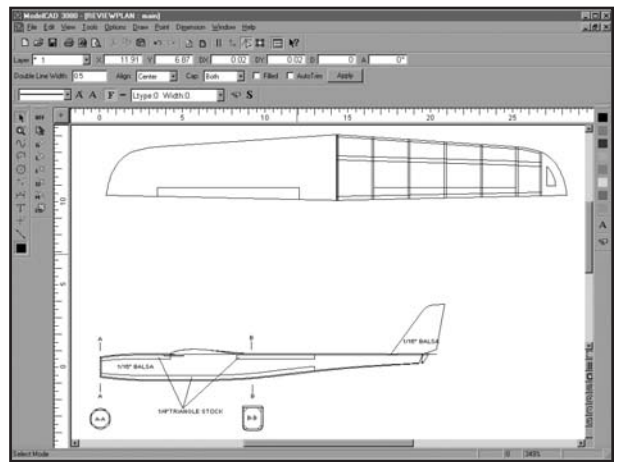
### Export and Tech Support

Once the wing was designed, I saved it, and then used the "Export" function that is located in the "File" menu. This lets you make any of the files created in Wingmaster (wings, ribs, and airfoils) available to use in ModelCAD.

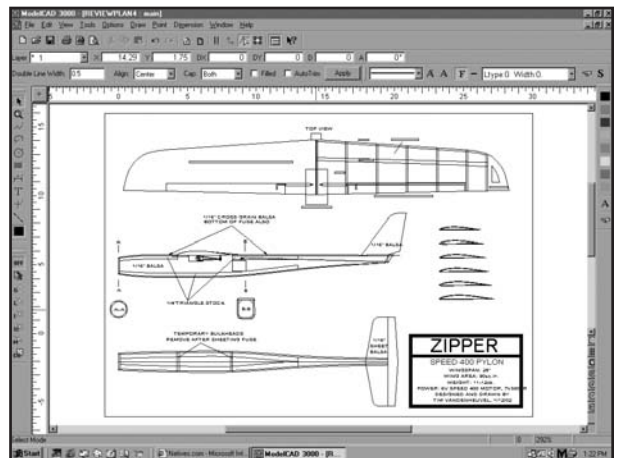
With the wing exported, I opened the "Import" function in ModelCAD, but the wing wasn't there. Thinking I had made a mistake, I went back to Wingmaster and exported the wing again. It still wasn't in ModelCAD.

It was time to use the Help File in the Wingmaster program. However, when I tried

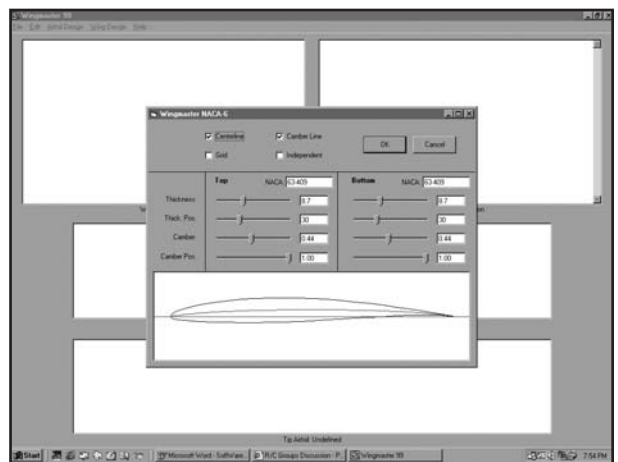
Here, the wing has been imported. The two programs compliment each other well.



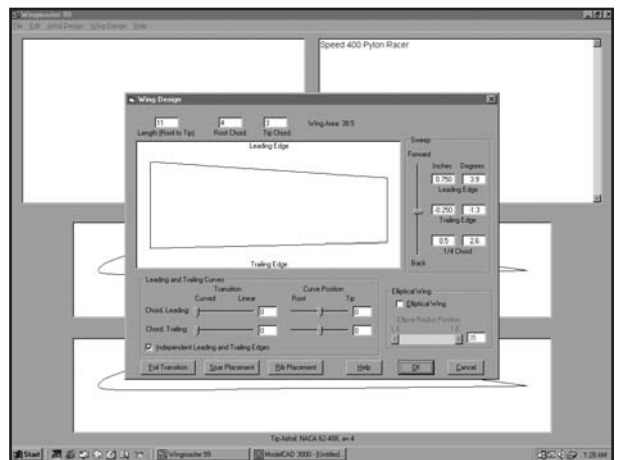
The airfoil design window. You can use the slides or input numbers to change the features.

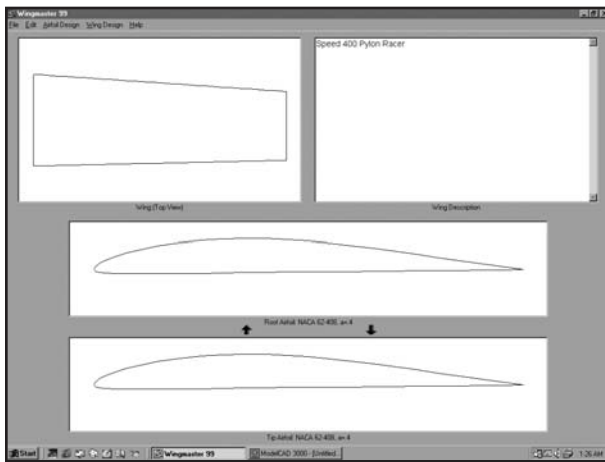


Here is where the wing is designed. Changes to a wing design can be made in seconds!

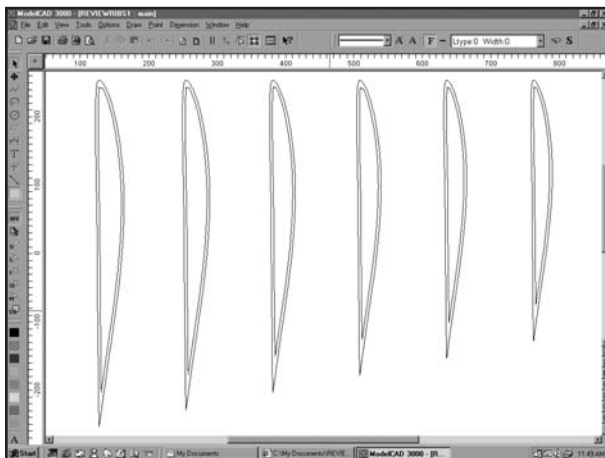


The finished wing. It looks too simple, but the ribs are already generated, and the spar has been placed.





The ribs have been exported from Wingmaster and imported to ModelCAD. ModelCAD can be used to modify them.



The final product! This took only a couple of short evenings. Projects take less and less time the more you use the programs.

to open the file, an error popped up that told me the file wasn't there. I was stumped! I had no other option than to call the free tech support.

The tech support was the best I had ever dealt with. The phone was answered by a tech support person, not a machine! I explained my troubles, and the gentleman informed me that the Help File had not installed properly. He promptly offered to e-mail it to me with installation instructions, and explained that sometimes a file can't be imported while Wingmaster is running. My problems were solved! Following his instructions led to success.

With the basic plan complete, you can use ModelCalc to predict whether or not the plane will fly. After providing all the parameters of the design, ModelCalc spits out the aspect ratio, wing loading, and power loading (for powered planes). It also provides the areas of all the flying surfaces and a recommended location for the center of gravity (CG), along with other information.

To see how accurate ModelCalc's CG predictions are, I input the design parameters for some existing airplanes in my hangar. I found ModelCalc's CG prediction to be an excellent starting point when compared to these real-world examples.

### Conclusion

ModelCAD provides everything a modeler could need in a CAD program. It has an abundance of features that make creating, modifying, and placing items fast and easy. The program makes CAD fun and provides tools that modelers can use. Unfortunately, time and space won't allow me to describe all the functions. You'll have to see them for yourself.

Wingmaster has taken model aircraft wing design to a whole new level. Tasks that would normally take hours to figure out by hand are handled quickly and effortlessly by Wingmaster. Like ModelCAD, Wingmaster is fun and easy. I found myself experimenting with it for no reason other than to see what I could create.

ModelCAD and Wingmaster were designed to be versatile, powerful, accurate, easy to use, and very affordable. That's exactly what these programs are. They provide all this, plus free tech support! Both programs are well worth the investment. ■

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