

# What to build?

by Mike Isermann

Choosing a scale project that has all the right attributes.

About 6 weeks ago I started to feel that yearly urge to develop a winter build list and found myself sitting in front of the drafting table with about ten possibilities staring back at me. I started assigning numbers of importance to each subject and would then debate reasons to move one up the list or push another down. It was kinda like trying to figure out where to go for dinner. You know what kind of food you care for, but you complicate a simple decision by coming up with reasons like, "I just ate there last week" or, "I'm tired of Mexican food." You just can't make that commitment.

For the last few years I have been drawing my own plans and/or modifying store-bought printed plans to my liking. I started thinking about how I go about choosing a subject and found I have a set of criteria in my head that I never realized. So I wrote down my criteria in order of importance and began trimming my list using a more systematic approach. My goal was to finalize a realistic number of projects for the winter.

I think it is important to note that I am an FAC member and participate in scale contests all around the country, so my criteria will take certain FAC rules into account as part of my evaluation of each subject. For those of you who like building and flying for the fun of it, my hope is that this list will be helpful in selecting a plane that makes you happy.

**Pleasing to the Eye-** First and foremost, the plane must be something that appeals to my eye. Of course, beauty is in the eye of the beholder and my idea of what is good looking is definitely not everyone's cup of tea. But that's what makes this hobby so wonderful! You want to choose a plane that excites your senses and has you itching to sit down at the building board. If you don't feel this sensation then the chances are your enthusiasm will fizzle and you will not complete the project. For me, unusual projects such as WWII X-planes really get my juices flowing.

**Complexity vs. Benefits** - Will the complexity of the subject quench my thirst for a challenge and will the hard work result in a plane that flies well? Are there FAC bonus points that will help overcome the probability of shorter flight times? Can the subject be built light enough without the worry of hard landings destroying my creation? These are important factors in my decision making process.

**Propulsion Configuration** – I like propeller arrangements that are not your standard run-of-the-mill in-line tractor configurations. Recently I have been attracted to twins. I am currently drawing a 36" Arado 240 twin. You want to look for aircraft layouts that cater to a modeler's needs. Things like motor peg clearance, room in the nose for a blast tube and long nacelles for that extra length of Tan II. You don't want to build a plane you will have to fight in order to fly. Make it easy on yourself.

When evaluating twins, be sure to consider propeller clearance between the nacelle and the fuselage. Short props (small diameter) are not that efficient. I recommend you look for configurations in which the prop clears the front of the nose such as the Mosquito. You may also want to look at where you will be able to place your hands during launch. Some layouts are not conducive to hand launches. Make sure you can engineer through these problems and don't wait until you are in the middle of construction and have no idea how to proceed. This will kill the project.

**Nose and Tail Moments** – Paying attention to this consideration will go a long way in making your plane lighter. I think it was Dave Rees that told me one time: on average, for every gram of weight you have in the tail of an airplane you will have to put 4 grams of weight in the nose to balance at a 30-40% chord C.G. A good nose moment will cut that number significantly. In some cases you will need little or no additional nose ballast.

Look at it this way: Your C.G. point is the fulcrum and the fuselage is a lever. The more weight you use to counter balance the long end of the lever the greater weight you are asking the wing to hold up in flight. If you slide the lever to a more neutral position on the fulcrum the less weight will be needed for counter balancing hence creating a lighter wing loading.

My 24" GAR Ki-61 Tony, which has a nice nose moment, only needed a gram or two of weight to balance keeping the overall weight (without rubber) at a respectable 34 grams.

Be prepared to build in a good amount of weight if you choose a short nosed WWI fighter or civil aircraft. Building the tail moment as light as possible will be a must!

**Wing Chord** – I always look at the root chord and tip chord of the particular subject before I settle on the aircraft. It is always nice to start with a good sized root chord because you have a better chance of "stretching" your flying platform when you start laying the wings out. With a long root chord you can push the tips out a bit and fatten them up without detracting from the proper look of the aircraft. This will gain you additional wing area reducing your wing loading and in some cases increase your  $R_n$ 's (ed. Reynolds Numbers).

**Airfoil** – I always look to see if a thin airfoil is feasible for the aircraft I am considering. I have grown partial to airfoils that are in the 8-11 percent range. A Neelmeyer and modified Clark Y (thinned) are the airfoils I typically use for my planes. They are almost always flat bottomed with an occasional semi-symmetrical business end. I have found these types of airfoils to perform well and are easy to construct using several building methods.

**Resizing the Empennage** - Take a look at the size of the rudder and stabilizer and decide if they need to be enlarged. Will the enlargement detract from the overall look of the plane? This is kind of a catch 22 question. Most airplanes we select will need some enlargement to fly. And at times it will make your plane look semi-scale at best. I try to pick a subject that only needs a 5-10%

increase in stabilizer/rudder size. I find there is a nominal change in the appearance of the subject. *(Ed note: Don't forget to add a bit of length to the fuselage to accommodate the larger stab — ask how I know that!)*

**Odd Shapes** – I try to stay away from airplanes with too many odd shapes that must be covered with tissue. The primary reason for this is that I know I will add unnecessary weight to the plane because I will have to use filler block and sheet wood to obtain the look I want. Some airplanes have too many little bends and funky corners to make them a viable subject for me to consider. Of course, this is where the eye of the beholder may determine otherwise.

**Ample Documentation** – I like to get on the internet or hit the book shelf as soon as I see something I like to determine if there is any good documentation available on the subject. The research is one of the things I enjoy most about our hobby. You will often find information you were not aware of that could turn a good project into an outstanding subject with super performance potential. Case and point: As I began drawing the Ar 240 I started to receive some of the documentation I sent off for and found out some really exciting facts. The aircraft I had started drawing had great moments, huge nacelles and decent wing and a lot of performance potential. After reading about several of the variants I found the wings had been lengthened four different times, the nacelles had to be lengthened to accommodate a longer engine and the stabilizer needed to be enlarged to improve flight performance. JACKPOT!!! Bigger wings, longer nacelles and a larger stabilizer. The only other thing I could have asked for is a helium filled fuselage!! The moral of this story is to check out all of the design variants before you settle on a particular design.

**Build What Makes You Happy** – In the end it's about the love of aviation and model construction. Sometimes I build airplanes just because I like them and I want to see if I can make them fly. It may not be the 35 bonus point airplane with bells and whistles all over it and it may not attract any attention from fellow modelers and I may not ever get it to fly for more than 35 seconds, but if it makes me happy, then I will build it. We only have one shot at this life, why not make the best of it and build something we like!

OOS Mike