

July 27, 2021

CAPS Newsletter, Fall 2021 edition

By Tim Lampe

Hello CAPS members. I'm your new CAPS newsletter editor. I'll try to provide useful and entertaining information in each newsletter, but it may not be as "polished" as my Pylon Racing column in Model Aviation.

For those of you who may not know, CAPS stands for Canadian/American Pylon racing Society. Maybe I can dig up more information about the history of CAPS for the next newsletter, but apparently, "back in the day," there were more clubs in the region in both Canada and the US that hosted pylon races collectively.

On a separate note, I was poking around on the AMA web site and was surprised to find how much activity is going there and how out-of-touch I am with the site. They have video updates on events/contests/what is going on in the AMA, podcasts, a digital newsletter and a lot more – some of which I'm not interested in, some I am. But one thing I thought was interesting was that you can easily access back-issues of Model Aviation. To look at back-issues, go to the AMA web site (I just do a Google search for *Academy of Model Aeronautics*, but you can also go directly to modelaircraft.org). When you get there, hover over the **Media & Resources** tab near the top of the page, then click on **Model Aviation**. When the page opens, scroll all the way down to **READ SELECT ARTICLES**. It will bring up a screen with the cover of every issue. There are ten pages of archived issues going back to about 2012. If you find an issue you want to look at, just click on that issue and the entire magazine will open.

Speaking of the AMA web site, I can never find the *Pylon Racing* rules very easily. So here's how you can get to the pylon rules quickly on the AMA site;

On the main page of the AMA web site, click on the **Events** tab (right next to the Media & Resources tab). Just scroll down to **RC Pylon Racing** under the **Radio Control** heading which is pretty far down the page. And speaking of the pylon rules, there's been a little chatter lately about the rules for the start of a race. Just for the heck of it, I thought I'd post relevant excerpts from the rules for the start of a race here:

13.1.7. Each heat race begins with the aircraft stationary at or behind the start/finish line and ends when the aircraft cross the start/finish line after completing 10 laps (or 11 laps for an aircraft that has cut once). The start of the race is initiated by the drop of the starter's flag or signal. Timers' clocks shall be started with the first drop of the starter's flag.

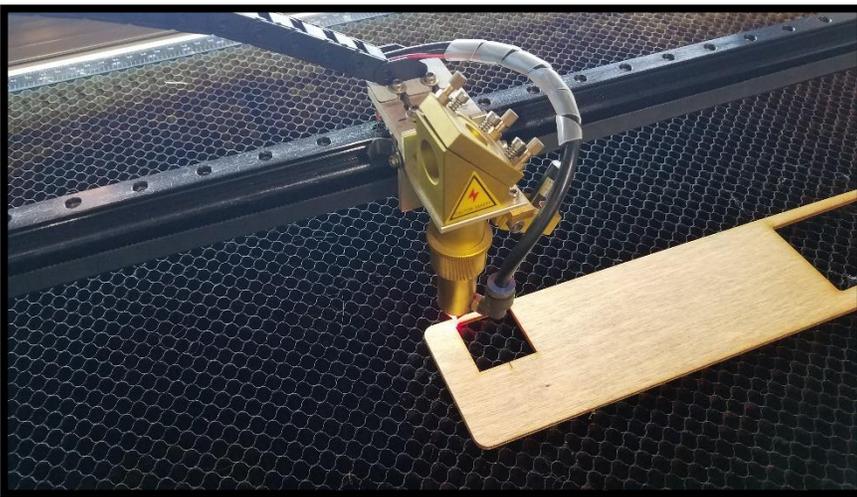
13.1.12. Pilots whose callers push off before their launch signal shall receive a cut for that heat. A blatant early push is a black flag offense.



Trying to think of something else interesting to put in this newsletter, as some of you may know, I have a laser cutter. I get questions on it from time to time, so I'll do a write up on it here. It's an 80 Watt, CO2 gas laser cutter (pictured). It begins with a glass tube in the back of the machine filled with CO2 gas. The tube is pretty much as long as the machine is wide (about 58"). Hi voltage charges the tube causing it to emit an unfocused light beam. The power is 80 Watts. This is probably in the medium power range for hobby grade machines such as this – they range from about 20W up to around 150W for affordable hobby grade machines. The cutting bead measures 1000mm x 600mm which converts to about 39" x 23.5".



The beam emits from the tube onto a mirror positioned at a 45-degree angle. The 2nd mirror (mounted to the gantry shown at left) catches the beam and projects it across the machine to the 3rd mirror mounted in the laser head.



The mirror in the laser head directs the beam from the 2nd mirror downward through the focusing lens to focus the beam into a small spot to cut (or engrave).

The materials and thicknesses the machine will cut depends on its power as well as the power and speed settings set by the user. I cut mostly 1/8" birch ply (for my topographic maps) at about 20mm/second and about 40% power. This is a relatively slow speed and medium power. I cut 1/4" acrylic at about 3mm/second and about 45% power. I like to keep the power low because it's easier on the tube.

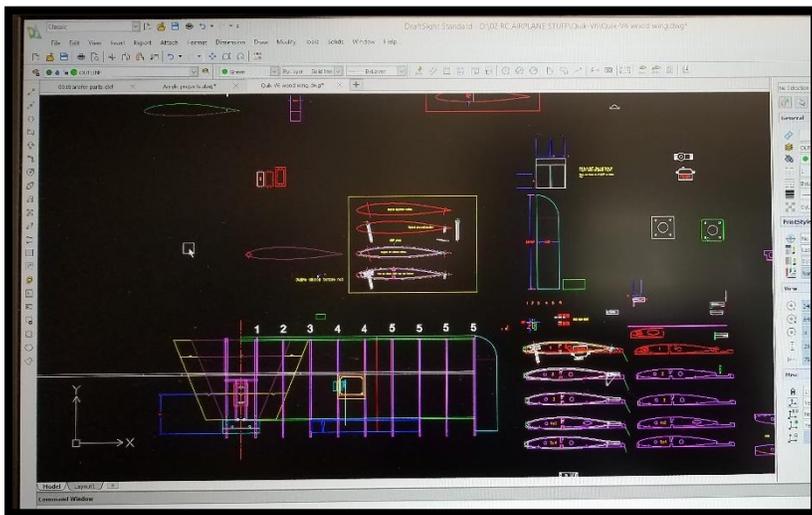
I cut up to 3/8" balsa pretty easily (depending on the density), 1/4" lite-ply and birch ply and all kinds of other stuff like paper, rubber, etc. It will also engrave which is simply the process of the laser head traveling back-and-forth many times to "color in" whatever it is you are engraving (typically text).

The beam width, or "kerf" of the cut for the lens I have is about .005" which is pretty good. Lenses with a longer focal length (I use a 2" FL lens) will cut thicker material, but will have a slightly wider beam width. Vice-versa for shorter FL lenses (1.5" FL is about the shortest).

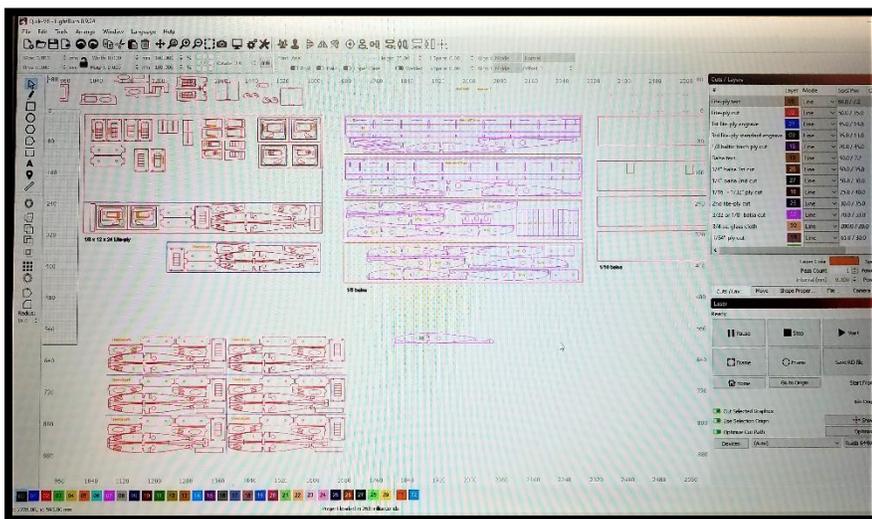
A higher-power machine will cut thicker materials, but the tube won't fire at lower power settings necessary for fine engraving or photo engraving I sometimes do. People who do more, better, detailed photo engraving use a 40W or 20W machine, but they can't cut thick materials. 80 Watts with a 2" lens is about the "sweet spot" for the kind of work I do including cutting model airplane parts from balsa, birch ply and lite-ply and some fine engraving or photo engraving.

The cutting bed is comprised of a steel tube framework that supports about 20 aluminum *blades* running from front to back. These blades support the steel honeycomb bed on which the parts rest. The bed moves up and down to bring the material you are cutting into focus with the lens in the head.

To the left of the machine you'll see the air compressor. This pumps air through a hose out through the cone of the laser head. This keeps smoke off the lens and also clears the cut as the beam moves along. Higher air pressure is desirable for cutting thicker materials as the beam will not be clouded by smoke. Behind the machine you'll see the air ducting going up to the ventilation fan near the ceiling that draws smoke and fumes out of the machine and out of the house. To the right of the machine you'll see the chiller. The chiller pumps coolant (I use RV antifreeze with distilled water) through the laser tube for cooling. My first laser cutter was a bit smaller which I purchased from a seller on ebay. These types of laser-cutters are often referred to as "clones" because they are so prevalent and are copies of each other. It was a great machine for the price (about \$2,500), but I just didn't need it after I got the slightly better and larger machine I have now. I'd say this laser-cutter is a medium-grade machine a step above my first one. It's a little better quality from a Chinese company called HL-Yeah. Dan Kane has one too, but a slightly different model. HL-Yeah has a good reputation and stocks machines domestically, so they ship right from the US. They are listed on ebay, but I purchased directly from them through chats on Facebook. It cost about \$3,500. This one comes without a stand which is what I wanted because it was easy to get through the door of my basement. Some come with stands that are removable, some come with stands that are not removable. I made my own stand.



I draw parts in a CAD program called AutoDesk by Dassault Systems (shown at left). It's exactly like AutoCAD if you've heard of that. A subscription is \$100.00 a year.



The machine reads file from another program called LightBurn, so I have to import files into LightBurn from AutoDesk. You can do some design/CAD work in LightBurn, but it's mostly a laser interface, so I do about 80% of the drawing in AutoDesk. Once the drawings are in Lightburn, you assign speed, power and many other parameters to each line color. A 1/8" balsa wing rib for example would be drawn in magenta with orange text on it. I assign a certain cutting speed and power to magenta so it will cut through, and a faster speed and lower power to orange so it will only engrave the name of the rib (say, "W1" for example).

I can also prioritize the cut order so it does the engrave first, then the cut.

It's great to have my own laser cutter. I can make just about anything I want whenever I want. I became addicted to the laser cutter we had when I worked in R&D at Hobbico. We had just a small 30W 12" x 24" machine. I didn't know how to set it up or how to adjust it, or even how it worked! All I knew was how draw and cut parts. But I came in early and stayed late many days to make my own parts. Now, if say, I'm making a servo tray, I can cut one out from scrap wood, test fit, and within minutes or seconds adjust the drawing and cut another until I have it just the way I want.

Two races remain in the CAPS district in 2021:

The Ben and Carolyn Martin Fall Classic August 21-22 at the AMA National HQ in Muncie, Indiana.

The final race of the CAPS season is new on the circuit. It will be the Midwest Sundowners 2nd Annual Pylon Race Saturday, September 11 in Wheeler, Indiana. I heard that last year's inaugural race was a lot of fun and is a great way to end the season for some of us. With just the two classes; EF1 and AMA 424 Sport Quickie 500, I believe the atmosphere is a little more geared toward pure pylon fun and a little more relaxed if there is such a thing when the timer goes down to zero and the race starts!

CAPS web site

I go to the NMPRA District 5 web site all the time, but I never knew there was a **CAPS** web site too! It's much the same as the District 5 site where you can register for races, see who has already registered, see the schedules, etc. But you can also access past newsletters and other documents under the **News** tab. The web site is simply capsracing.com.

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