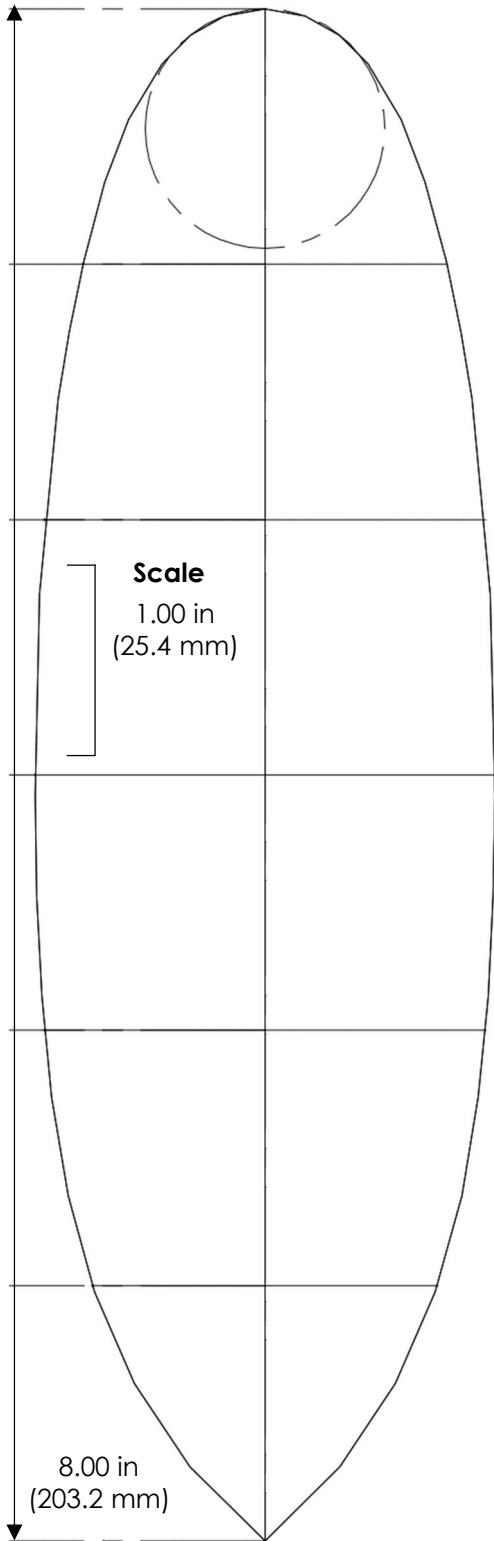


Long Lady
 By Emily Guyett
 Tillamook Labor Day Weekend
 2023 F1D Half Motor Contest
 14:55 + 14:40



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Motorstick	0.386 g	
Stick	0.242" ID Mandrel 0.013" 4.2 # C grain x 12.75" 0.003" boron at 12, 4, 8 o'clock	
Webs	0.020" 5 # C grain	
Bearing	Harlan with uni carbon gusset	
Rear hook	0.013" music wire	
Wing posts	0.065" x 0.045" 6 # A grain 0.004" boron 2 each side	
Stub	Harlan mandrel tapered from 0.242" ID to 0.224" ID 0.013" 4.2 # C x 3" 0.003" boron at 12, 4, 8 o'clock	
Bracing	0.001" tungsten wire	
Boom	0.188 g	
Boom	0.009" x 18.0" 4.5 # C Harlan mandrel 0.003" boron at 12, 3, 6, 9 o'clock	
Posts	0.050" x 0.040" 6 # A	
Rudder	0.025" x 0.025" 5 # A Y2K covered	
Wing	0.324 g	
Spars	0.055" x 0.035" 5.0 # A 0.003" boron top and bottom	
Tips	0.040" x 0.030" 5.0 # A	
Outer ribs	0.032" x 0.060" 5.0 # A	
Inner ribs	0.022" x 0.060" 5.0 # A	
Covering	Y2K	
Stab	0.152 g	
Outline	0.040" x 0.025" 5.0 # A 0.003" boron top and bottom first 9" of stab frame	
Ribs	0.025" x 0.050" 5.0 # A	
Covering	Y2K	
Prop	0.265 g	17.8" Diameter x 30" Pitch
Outline	0.040" x 0.025" → 0.025" x 0.025" 5.0 # A 0.004" boron top and bottom, and side of inner 2 bays	
Spar Rib	0.030" x 0.050" 5.0 # A grain 0.004" boron top and bottom	
Other Ribs	0.022" x 0.040" 5.0 # A grain	
Spar	Carbon pultrusion 1.0 / 1.2 mm ID/OD	
Covering	Y2K	
Spacers	0.038 g	
Spacers	0.013" music wire x 0.25" long x 2 Teflon added to support rubber motor	
Rubber	0.200 g	5/99 29.6 mg/in (1.165 g/m), 715 turns
Ballast 1	0.030 g	Rear wing post
Ballast 2	0.020 g	Front stab post
Total	1.403 g	

Long Lady

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Several people have suggested I publish my plans for my current F1D program after performing well in an informal F1D half motor contest held in Tillamook, Oregon over Labor Day 2023 weekend. I tabulated some of my times in a table below with relevant notes. I flew two models in the three-day contest to get them ready for the 2024 F1D World Championship in Romania this spring. Some notes on the models below:

- **Purple model:** This has been a build copy of previous iterations of *Long Lady*. Throughout most of day 3, this model had a bad racing habit at the beginning of climb, and it struggled to climb for much of Day 3. Despite this it performed very well while staying below our team altitude target of 29 yd. The model cruised very efficiently and dead-sticked on all full-wind flights when the trim was dialed in. Later in the day I discovered the rear wing post was loose in the joint with the motorstick and that was repaired. With little time left in the day, and only one half-motor left that I had made, I needed to verify that fixing the loose rear post fixed the climb issue. A motor was wound to 96% of target turns and launched. The racing issue had disappeared, and the model easily got to 28 yd without a fuss indicating the issue was resolved.
- **Black model:** This is an experimental model derivative of the purple model and has a few new features listed below. It climbed very well but was very close to stalling at launch. Most of the time trimming this model was fighting through the power stall. This ended up needed over 2deg of down thrust and 5 deg of left thrust in addition to some stick bow and 2 deg of left rudder. My best way to describe how it looked is like a tractor going uphill, very steep, and slow. While a little close for comfort in making it through the climb without stalling, it was very efficient and climbed very high and dead-sticked with about 3yds of altitude on every flight. Time will tell if it climbs as well in the salt mine this March.
 - Slightly smaller diameter motorstick mandrel of 0.234" (5.94 mm).
 - Much stiffer and heavier wing than the purple model (the purple model has a very flimsy wing)
 - Extra boron on bottom of motor stick in the 6 o'clock position in addition to the 12, 4, and 8 o'clock positions.

I named this design *Long Lady* for its progressively longer model length than my previous F1D's standing currently at 33 inches (838 mm) when most other models typically keep around 30 – 32 inches (762 – 813 mm). Additionally, this model design incorporates a stabilizer about 10% larger than previous iterations with a 6-inch elliptical chord. I have found improved times in these longer models with larger stabilizers. I'm not sure why, but I theorize that additional model length might allow the cg to move aft and load the large stabilizer more while maintaining adequate stability. I also theorize that having a longer model might improve dynamic stability, meaning it will dampen out disturbances to its attitude very quickly due to a large damping effect when you try to pitch the aircraft up or down. For this contest I flew with the same propeller and played with increasing propeller pitch to slow down RPM and adding additional time when the model started to dead-stick. I did this instead of decreasing rubber density because I thought that by flying at higher pitch-to-diameter ratio more efficiency can be gained in the propeller by loading the blade at a more efficient angle of attack, especially with the propeller I used which had a pretty large blade area. Though the black model did the best overall time on day 1, I found the purple model on day 1 to be the most impressive as it had similar times than the black model on day 1 with less maximum altitude and no potentially risky stall issues. For the final flights on Day 3 I took a

detailed record of height and RPM vs time once the model was near it's max height. I put those graphs below as well. If you have any questions feel free to reach out to me at ameg3237@gmail.com

~Emily Guyett

#	Time	Motor (mg/in g/m)	Turns Wind	Backoff	Launch Torque (in-oz g-cm)	Max Height (yd m)	Turns Left	RPM
Day 1 / Sep 3, 2023 / 70F inside / Black Long Lady model								
1	14:46	29.3 1.15	695 3 rd	0	0.441 31.8	32.8 30.0	0	47.1
2	14:59	29.3 1.15	706 4 th	0	0.444 32.0	32.0 29.3	0	47.1
Day 2 / Sep 4, 2023 / 65F inside / Black Long Lady model								
3	14:28	29.4 1.16	692 3 rd	0	0.428 30.8	32.0 30.0	0	47.8
4	14:15	29.4 1.16	705 4 th	5	0.369 26.6	28.5 26.1	4	49.5
5	14:37	29.4 1.16	717 5 th	5	0.386 27.8	28.5 26.1	5	48.6
Day 3 / Sep 5, 2023 / 65F inside / Purple Long Lady Model								
6	14:40	29.6 1.17	702 4 th	0	0.418 30.1	27.2 24.9	0	47.8
7	14:55	29.6 1.17	715 5 th	0	0.426 30.7	28.0 25.6	0	47.9
8	14:04	29.6 1.17	678 3 rd	0	0.410 29.5	27.8 25.4	0	48.2

