

X-99, one meter scale-sailboat

A printable RC sailboat by YACHTPRINT, Chris Angelduro

Version 3.0 from 02/2024



The X-99 “3D” is based on the original X-99 from the renowned Danish yard X-Yachts. The original is an active racing class in Europe, with more than 600 boats built. The hull replicates the original hull and deck lines with adaptations to the model scale to ensure the floating line and functionality.

Parts needed besides the printables:

- Threaded inserts for PLA size M3, e.g. from “Ruthex”
- Sheet line and 3 ball bearing blocks or 3x ball bearing 4x8x3
- Keel & Bulb from DF95, IOM style rudder, see text below
- Sails and rig of a one-meter boat, see text below
- RC: 2-channel transmitter & receiver, strong sail-servo min. 30kg and standard- or midi-sized rudder servo, preferably water tight, like those from “Savöx”

PRINTING

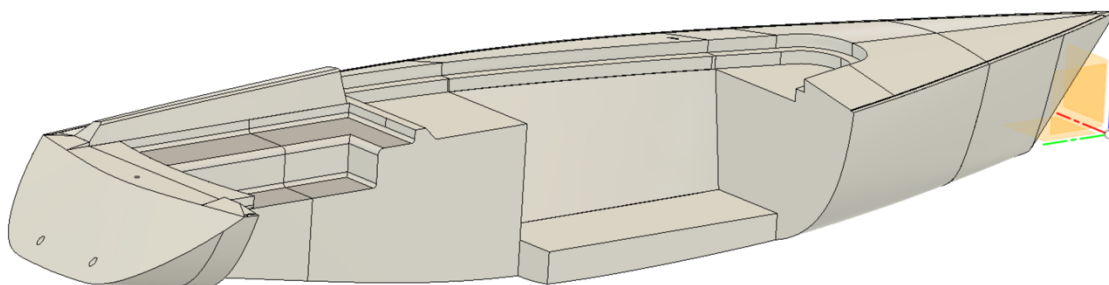
The hull- & cabin sections are printed with LW-PLA. Slicing can be done in normal mode (not case) with two perimeters/walls. Adjust the flow% and temperature until you achieve a wall thickness of 1,0-1,1mm using a 0,8mm nozzle. Print with 10-20% infill “Lightning” to facilitate the closing of the upper horizontal layers. Don’t use any other infill type, as the segments must stay hollow for the equipment. You can of course print in any other material.

The hull sections that are cut in half (H2/3/3) and the coaming represent the left side of the hull and must thus be mirrored in the slicer for the right side. In general, all parts marked with an “L” must be mirrored.

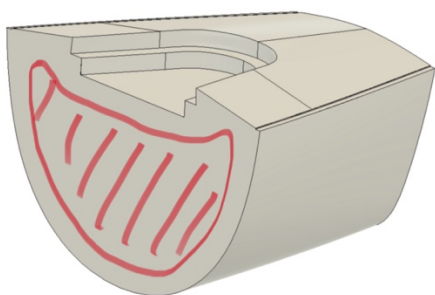
The bulkheads, keel box and servo tray is also printed with LW-PLA but with 3 walls and 30% infill in order to get the right strength. The fittings and and servo arm & -bracket can be printed in PLA or any other strong material like carbon.

ASSEMBLY

The assembly is straight forward as the hull sections are glued flush with a butt joint. Cut away the inner section of the glueing faces and leave a 5-7mm edge as glueing surface. These edges serve as “integrated” bulkheads, so almost no additional bulkheads are needed.



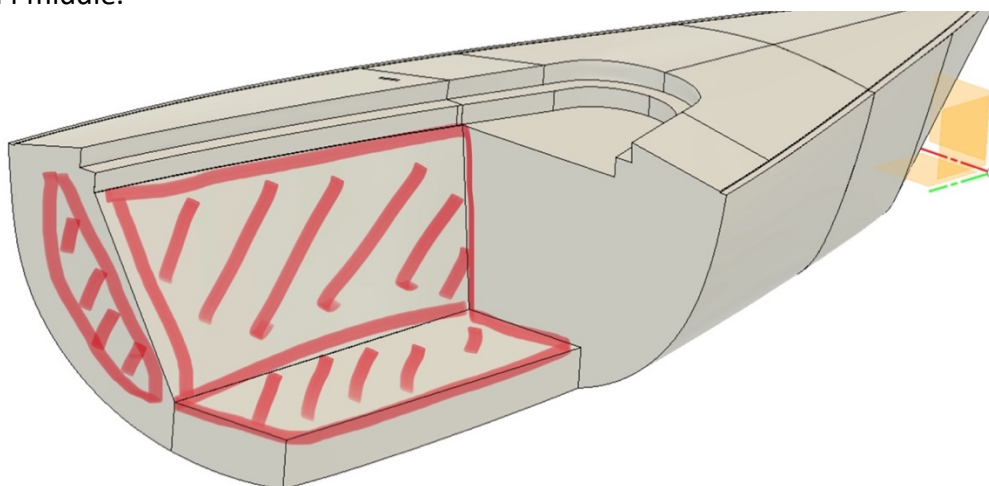
The new split of the hull into sections with an extra “middle” section for the keel box



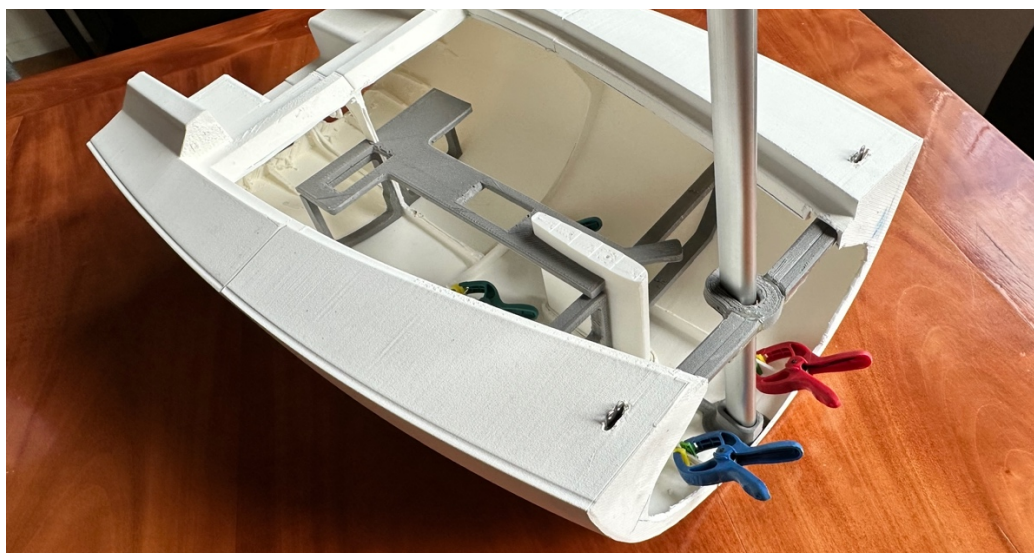
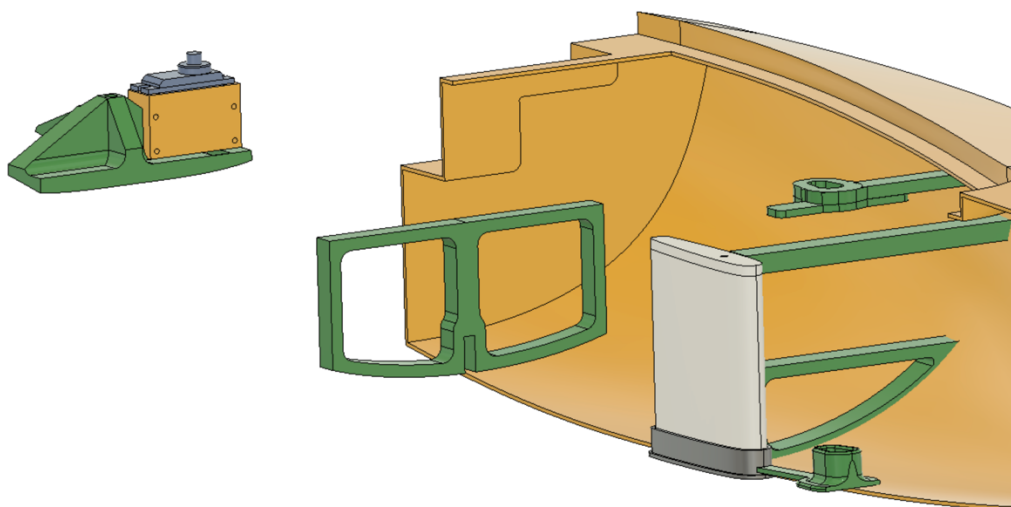
cut away the inner surface of the vertical faces

Start with the bow section H6 of the hull and reinforce the deck below the forestay attachment points with a strong plate or (better) one or two layers of 200g carbon. Now, you can glue H6 and H5 together.

Next is mid hull section H4: parts “L”, mirrored for “R” and the “middle” section) with the installation of the keel box, mast base and the keel bulkheads that support the keel box. You have to cut the diagonal walls H4 L/R open. If you want you can leave a diagonal edge from the glueing surface in addition to the outside edge (I found it not necessary though). Cut away the upper, horizontal face of H4 middle.



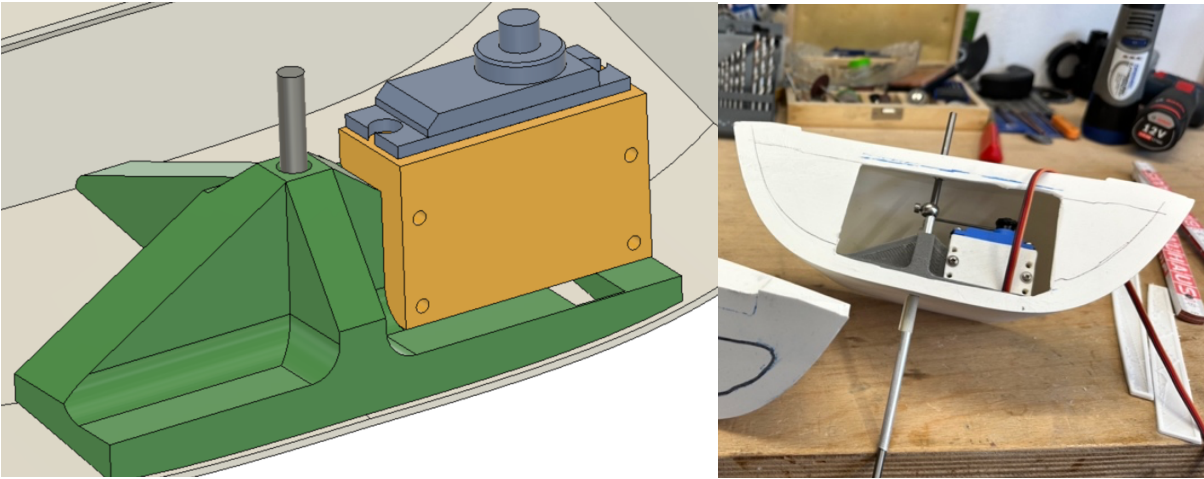
Install the “green” bulkheads as shown below. You should also install some shroud attachment stripes to the main bulkhead now. I used small metal plates. Make sure that the keel box and keel box ground plate is glued in firmly to the bottom of the hull so that the boat is watertight.



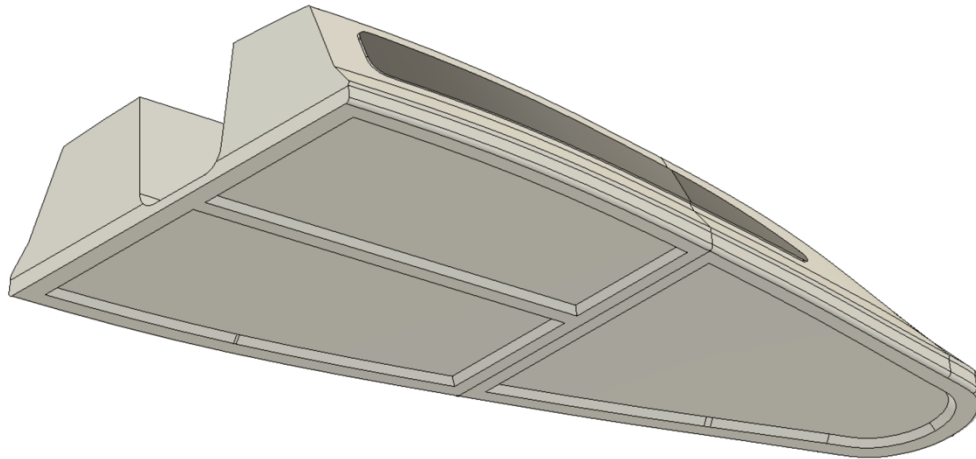
The main bulkheads don't need any extension around the hull due to the good stability of the hull segments and deck. It is important though to firmly connect the L- and R-part with the mast collar in the middle. By that the compression load can be absorbed. I recommend to NOT YET glue in the mast foot. You can do this later and adjust exact mast positioning.

Glue in the rear two-piece bulkhead in the stern section H1 and make sure that the tube for the rudder stock is perfectly perpendicular. You can use the upper hole in the deck to align the rudder tube.

You can decide now if you want to install the servo in the rear, next to the rudder or on the central servo tray. I recommend the rear position (see below) for weight trim and because the central servo position can then be used to trim the main sail independent from the jib.



The cabin consists of two segments. The forward segment gets glued to the deck in the respective recess and the rear cabin segment will serve as a hatch to the RC installation. The side window (L and mirrored R) is left one-piece and it is glued to the rear cabin segment. By that you avoid any misalignment of the window at the seam of the cabin segments



The cabin does not need any bulkheads. The rear part acts as a hatch while the front is glued to the deck permanently. The hatch holds in place by tight fit.

APPENDAGES

A scale-keel & rudder is part of the file package and can be fitted for display. For actual RC sailing however, you need bigger appendages. Use the keel blade and weight bulb of the DragonFlite 95 Yacht (DF95) which fits into the keel box.

For the rudder you can either scale up the scale rudder in the slicer or print the IOM style rudder from the file package. The rudder axis has a diameter of 4mm and is stainless steel.



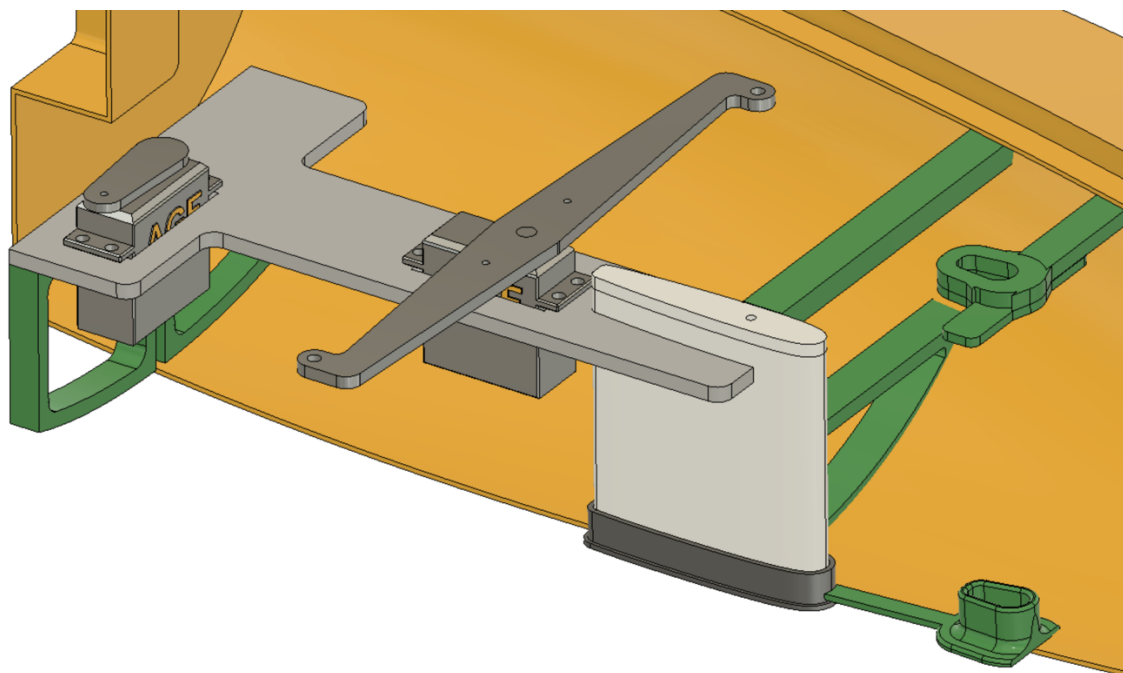
Display configuration



Sailing configuration

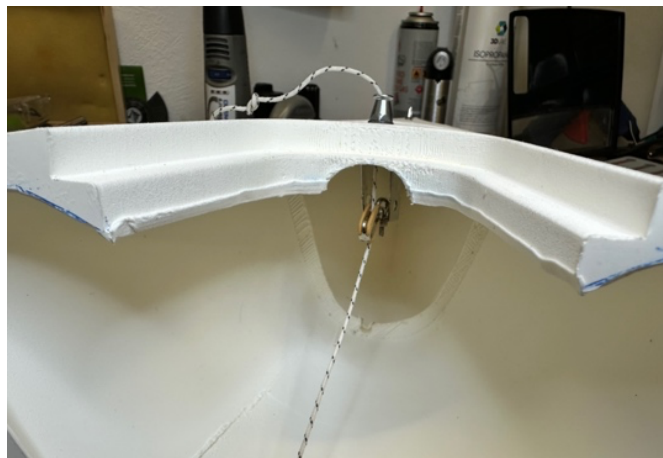
RC INSTALLATION

The RC components are mounted on a tray that is attached to the keel box and the mid bulkhead. The mid bulkhead must be adjusted slightly to the remaining hull segment edges. The battery goes underneath the left cockpit bench to support the right weight distribution. You can cut out a hatch in the cockpit bench for easier access to the battery.



The sheeting system consist of a central, strong sail servo with a long servo arm.

The sheet line for main sail and jib are attached on opposite sides and run through blocks (not shown in pic) mounted at the ends of the servo arm. From there the sheets run through the deck outside. Make sure to guide them as straight as possible and via ball bearing blocks if possible. The forces are considerable. You can use the STL-files for blocks and standard 4x8x3mm ball bearings for that.

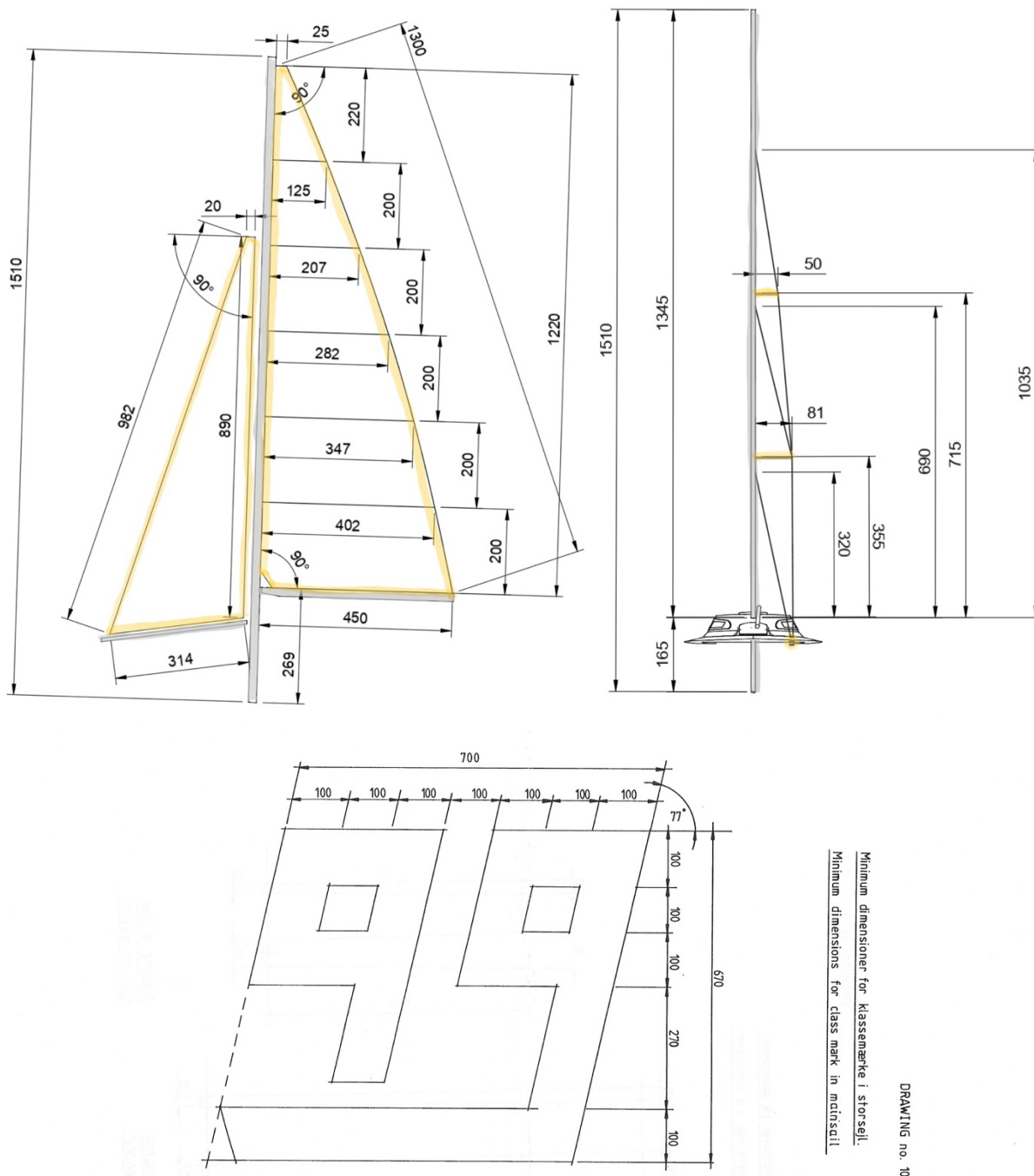


For the mainsail you can choose to attach the sheet line to another servo arm. By that you can trim the main sail independently from the jib. See the picture above.

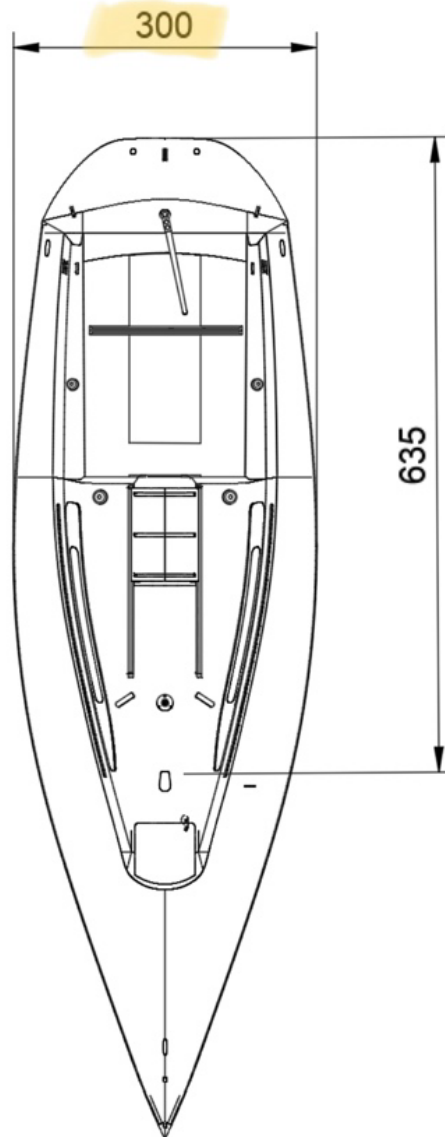
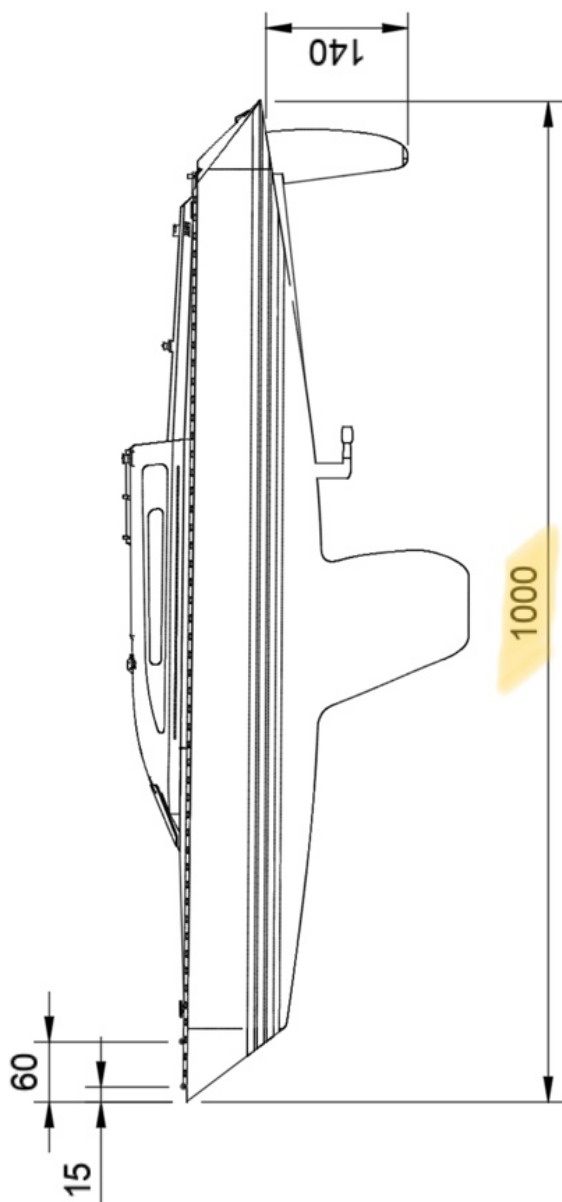
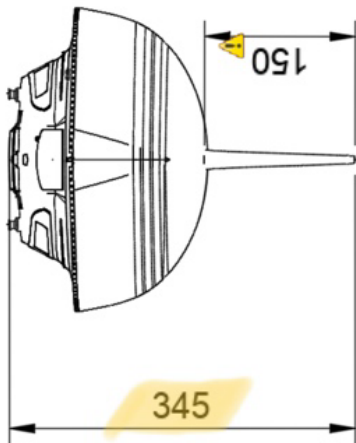
RIG and SAILS

The rig is a standard configuration with an aluminum mast and a self-tacking (pendulum) jib. Plans with measurements for mast and sails are found below and under “pictures”.

The mast stands on the keel in front of the keel box and has a total length of 1510mm (1500 will do as well). The boom is 460mm. You can purchase rig parts from “mkpmodellbau.de” or at “newcapmaquettes.com”. Or you purchase an old 1m boat and adapt the rig to the boat.



HAVE FUN! KEEP ME POSTED, PLS. 😊



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ACTIVELY post about your project in the Facebook community. I love discussing and gathering new views.

PRINT IT, BUILD IT, SAIL IT and HAVE FUN!

Your

Chris Angelduro
YACHTPRINT

