A sailcockpit inspired by “Sailsteer of B&G“ plotter

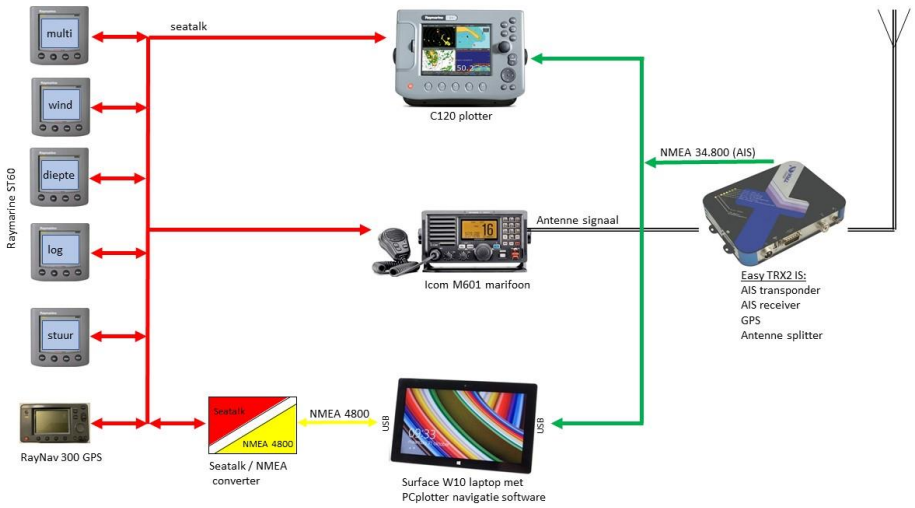
Introduction

At sy Beagle (a Breehorn 44) there is still an older Raymarine C120 plotter operational. This plotter is from 2005 and sometimes it is not functioning very well. Therefore a back-up system is made based on Raspberry Pi hardware (4B) and “OpenPlotter” as software environment. The system is still in a test phase.

In order to understand the “Node-Red” flows build for the Sailsteer cockpit, it is good to understand the set-up of the instruments and boat network.

“As-Is situation”

The navigation set-up consist out of the following components: EasyTRX2 AIS + Raymarine depth, log, autopilot + GPS + Plotter C120 + VHF radio + Laptop. The components are connected to eachother as depicted below:

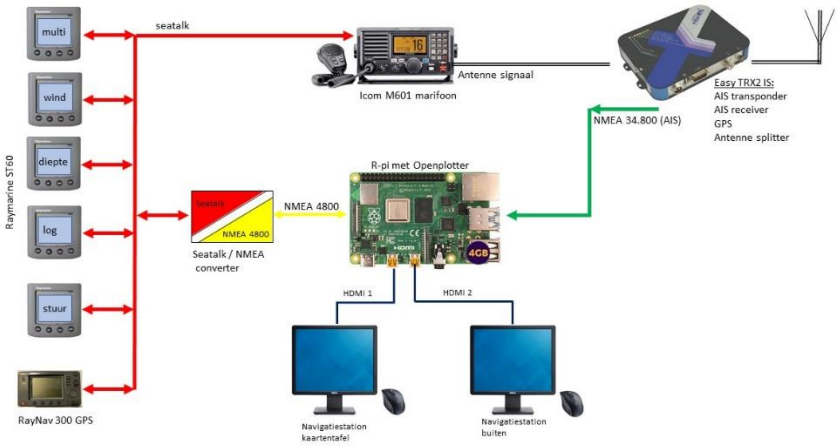


An explanation in short:

- The Surface laptop, with PC-Plotter, is used for navigation at the chart table;
- A route at the laptop is converted into a sequence of waypoints;
- Waypoints are downloaded via the Seatalk/NMEA converter to the GPS;
- Only one waypoint will be activated at the GPS;
- A active waypoint will be visible at the C120 plotter outside;
- The C120 plotter outside can not handle routes and more than one waypoint;
- The AIS data from surrounding ships will be send from the Easy TRX2 to plotter and laptop.

The new solution?

The new setup is to replace the older Surface and the C120 plotter with the Raspberry Pi and two monitors. One at the chart table and one outside. The Breehorn has a fixed doghouse so the screen outside is well protected from the rain:



The software set-up?

The system is based on standard components from the “OpenPlotter” suite. OpenCPN for route planning and actual navigation (incl. AIS). Signal K for storing/buffering the NMEA data. Signal K receives the data from OpenCPN. Via this way for instance the active waypoint is also received in the Signal K environment. Node-red is used to build the “Beagle Sailsteer” dashboard. The following nodes should be installed in your “node palette” first to get the flows running:

- Dashboard nodes / (node-red-dashboard);
- SVG node / (node-red-contrib-ui-svg);
- Signal K nodes / (@signalK/node-red-embedded).

The Beagle Sailsteer cockpit is developed with no parameterisation or flexible customer settings in mind. So is for instance the Layline degrees defined in the node “Calculate Laylines” as a variable (LL). This can be changed in the node itself to modify it to your boat characteristic.

The Beagle Sailsteer cockpit is heavily based on SVG. SVG is a vector graphic format—based on XML and is used to display a variety of graphics on the Web and other environments. Under the hood, SVG documents are nothing more than simple plain text files that describe lines, curves, shapes, colors, and text. As it is human-readable, “easily” understood and modified.
The SVG node has a build in graphic editor (first tab) to create all kind of graphics. Be aware that the Sailsteer cockpit is created directly in SVG code statements (SVG source tab). There will be an error code reported if the SVG Sailsteer definitions will be opened in the graphic editor (first tab). It is recommended to “play” a little bit with some simple SVG diagrams to understand the logic.
There are also a number of objects running in “simulation” mode like the compass rose. If the heading is changing the compass rose will take 1 sec to move from the previous value to the new value. In this way a more natural behaviour is simulated. This is also the case for the true wind direction, apparent wind direction and the laylines.

The cockpit is not yet tested at sy Beagle. So the integration with the instruments can be reason for some changes is terms of dimensions (m/s,knp). Also there could be some changes in the wind direction. I don’t know what my wind instrument will deliver the wind direction from 0-360 degrees or from -180 to +180 degrees. Some of these modifications should be applied depending on the boat instrument situation.