May/2015

RabadakPilot

An Autopilot prototype for small boats
with an outbord manual motor

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Boat examples

Pictures from internet

Goal

- Draw a path in Google Earth
- Save track as KML
- Convert KML to GPX (route or track)
- Upload it to Garmin 60Cx
- On lake: made connections (linear actuator to outboard motor, connect RabadakPilot box to GPS and actuator and battery connections)
- GPS activation (Route or Trackback or GOTO wp)
- Start the engine, choose your speed and
- Sit back and LET IT GO...

Google Earth Path example

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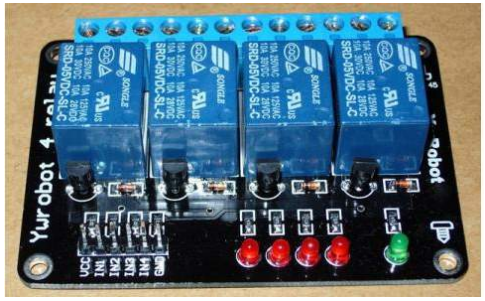
The components **Pictures from internet**

GPS

ARDUINO
UNO R3



4 Relays panel
12V 10A

12v Boat
battery

Linear Actuator
12V 10A

http://www.rfcontrolsystem.com/index.php?main_page=product_info&cPath=452_455_460&products_id=1538

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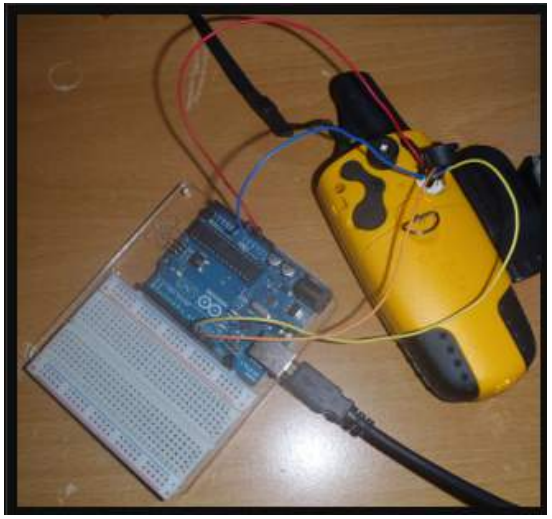
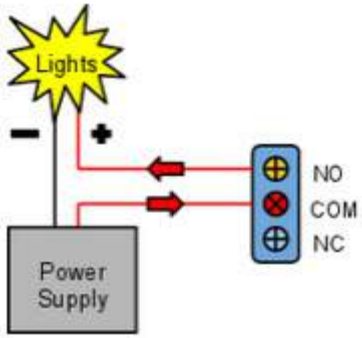
Arduino-GPS connections

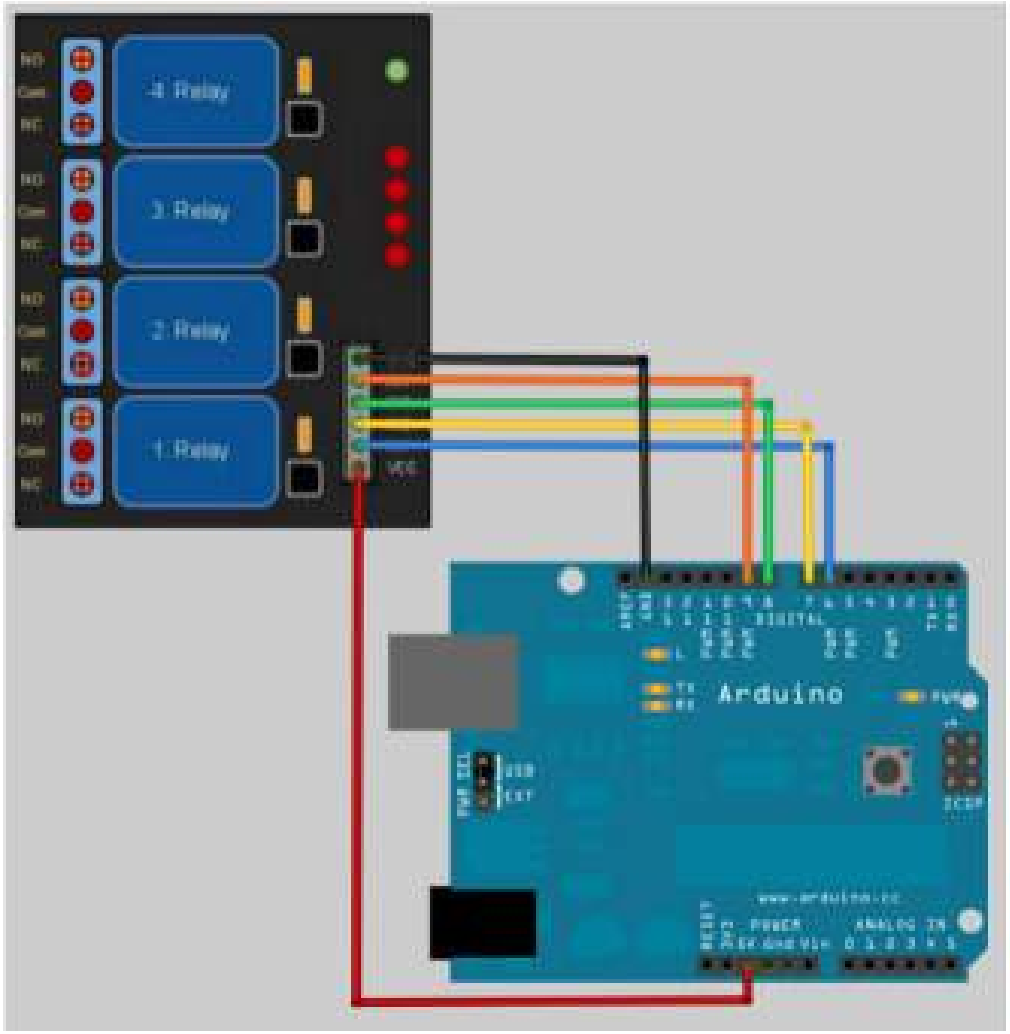


Picture from internet

My case, my connections
only TX and RX from Garmin 60Cx

Arduino-Relays Panel connections





Picture from internet

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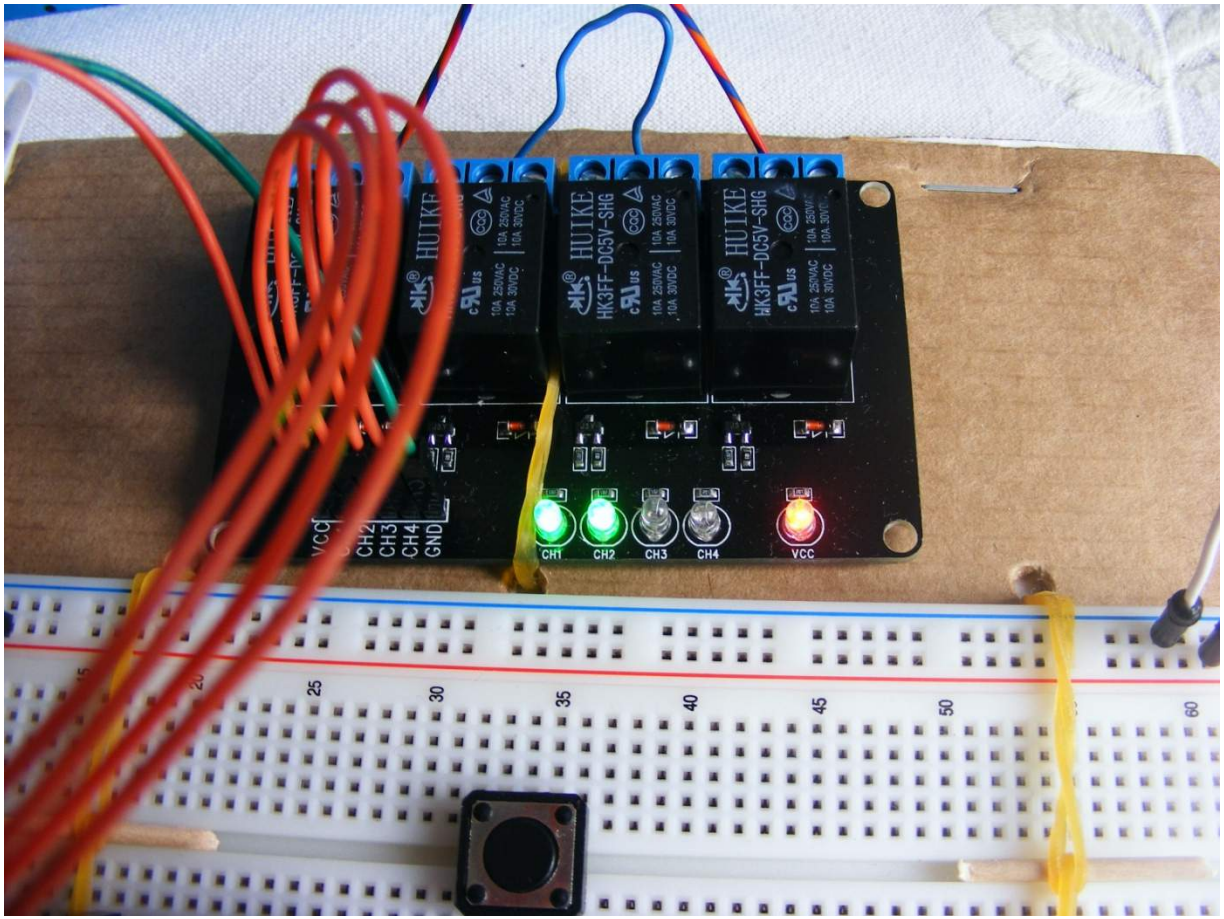
Arduino-relay panel My connections



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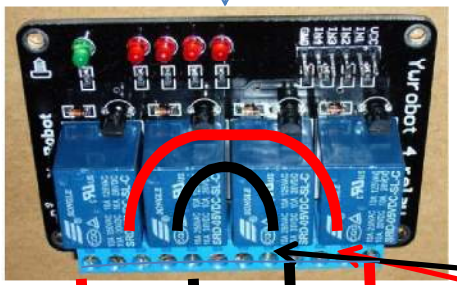
Assembling (all together)

NMEA Sentences
$GPRMC
$GPRMB
$GPWPL

GPS with:
1 - Active route, or
2 - Active TrackBack, or
3 - Active GOTO point

ARDUINO INPUT:
Actual velocity, Actual heading, Correct heading, LAT/LONG next Waypoint
ARDUINO PROCESSING:
Heading correction, Manouver time in seconds based on velocity and distance to next waypoint applying some tolerances.
ARDUINO OUTPUT:
Manouver time to left SET A+A-
Manouvert time to right SET B+B-
After, in both cases, straight the rudder doing the oposite manouver with the same time in seconds.
OBS: It's suposed start wiith aligned rudder with the bow



12v Boat battery

A+ A - B- B+

A or B

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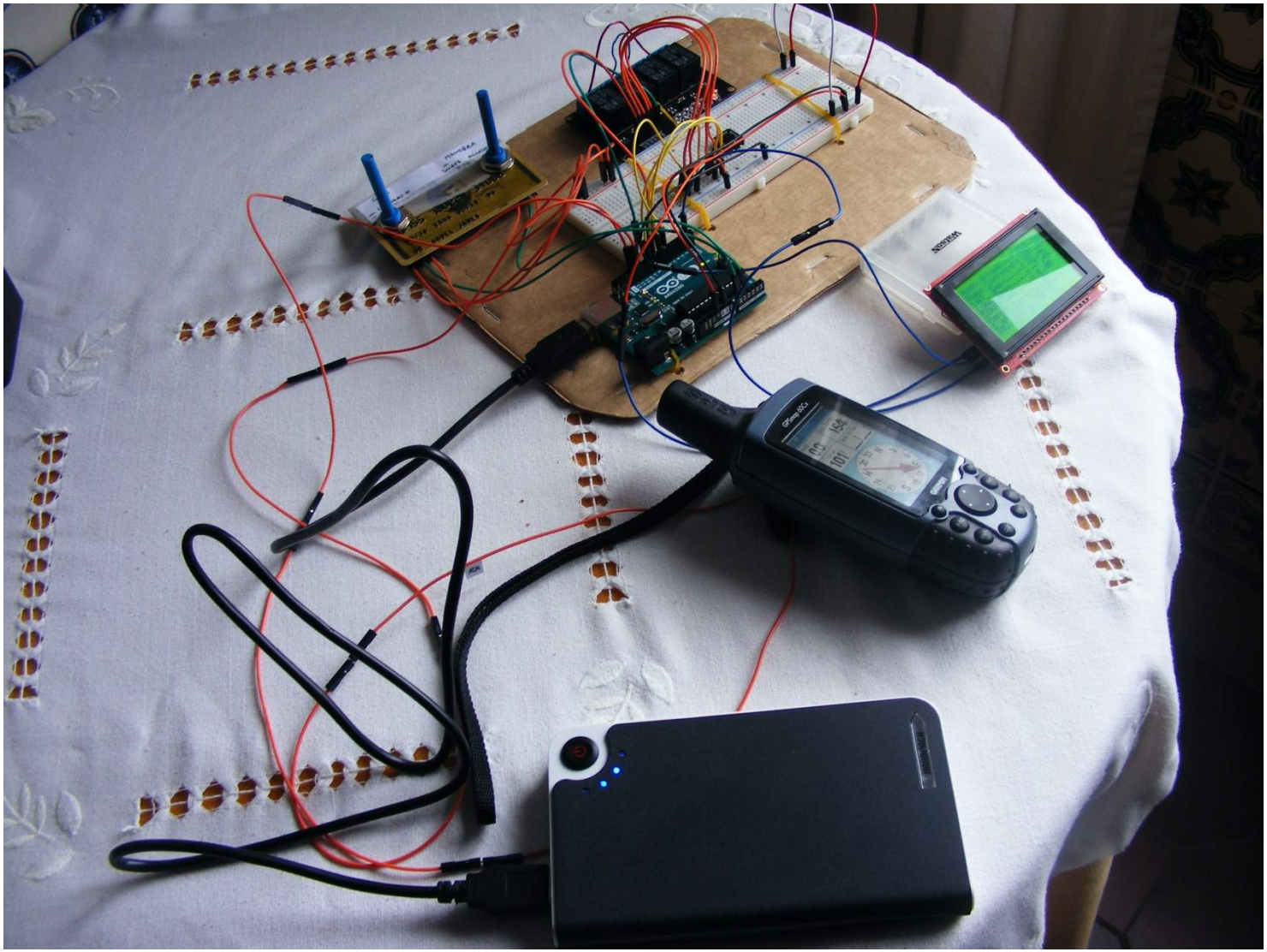
My prototype



For readings, a nice to have (LCD)

- Actual Heading
- Correct Heading
- Latitude at Destiny
- Longitude at destiny
- Heading Correction (+ is Right, - is Left)
- Manouver Time in seconds (*)
- Destin. Waypoint in KM and Velocity in KM/h
- Next GPS read in 29 seconds (**) (and refresh LCD)

(*) Manouver Time is controlled with a several software maths linear equations and a potenciometer.

(**) GPS frequency reads is controlled with a potenciometer (0 to 30 seconds for next read)

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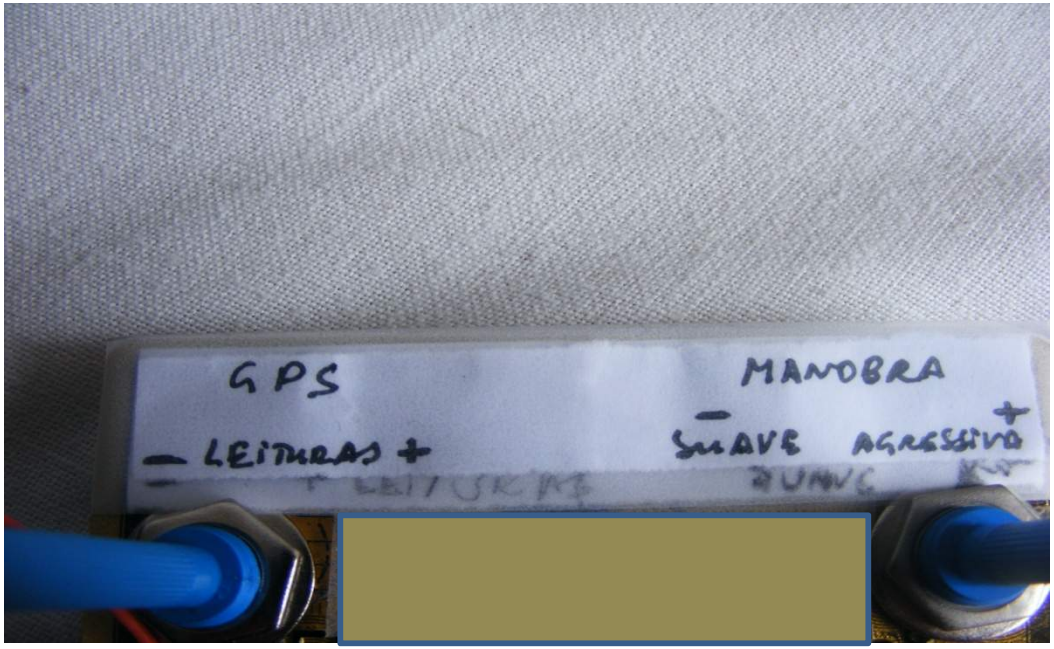
The potenciometers



GPS frequency of reads.
More reads at start, less reads
when navigating and enjoying
the views. Avoiding zigzags.

Manouver control
(less agressive or more agressive)
More agressive at start, less agressive
when navigating and enjoying
the views. Avoiding agressive zigzags.

...and let it go, let it go, let it go.

Tests

- Works fine in a car on big open space field.
- Works fine when walking on big open space field.
- OnBoard... will be the next phase (need enclosure all in a waterproof box and choose the right connectors).
- Maybe will join a compass chip to the project (faster reads and more accuracy of Actual Heading than from GPS).

I need your FEEDBACK

- Please feel free to post your opinion.
- Please be very critical (positive or negative)
- All the posts are welcome.
- My mail is rabadak.pilot@gmail.com
- Share ideias???

Tanks to All...