Water Intelli-Buoy

Team 2

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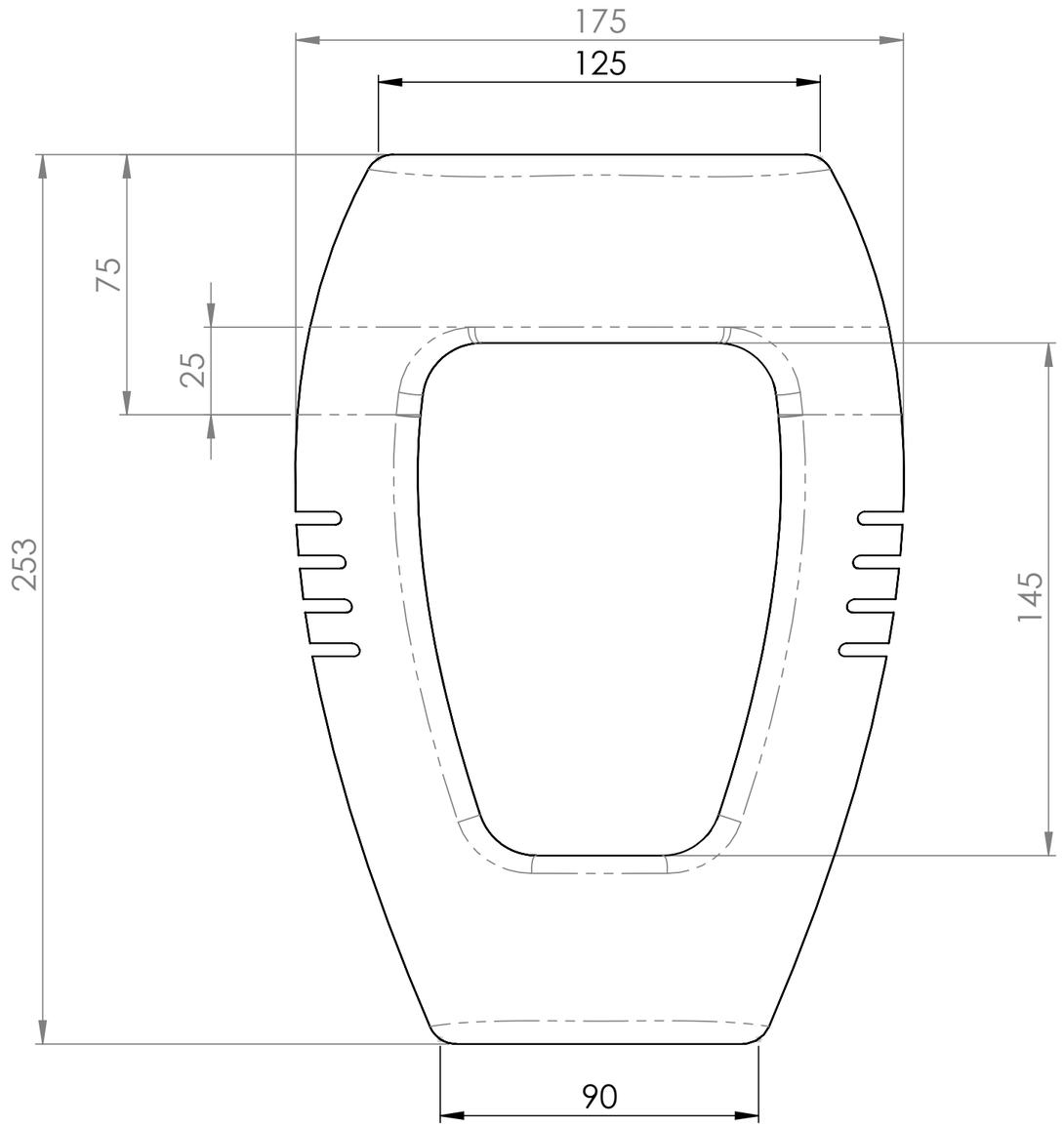
Power budget

Component	Operating voltage (V)	Current (mA)	Power (W)	Dimensions (mm)	Weight (g)	Price (€)
ESP8266 WIFI Wemos D1 Mini Pro 16M	3.3…5	550	1.82	34.20x25.60x10.00	2.50	14.99
Turbidity sensor SEN0189	5	40	0.20	38.00x28.00x10.00	30.00	8.12
Temperature sensor DS18B20	3.3…5	1.5	0.0075	6.00x50.00x500.00	60.00	7.30
Temperature sensor DS18B20	3.3…5	1.5	0.0075	6.00x50.00x500.00	60.00	7.30
Charging module TP4056	-0.3…8	1200	5.04*	25.00x19.00x10.00	10.00	4.90
Battery		2600	3.70	65.00x18.40	43.80	5.50
Panel		100		50.00x100.00x3.00	XX	4.80

Updated 3D model

- 25% larger (components wouldn't fit)

- Rounded seal corners (better sealing)



Total price estimation

- Production costs: +/- €100
- Service cost: +/- €50
- Margin of profit: +/- €50

Total: €200

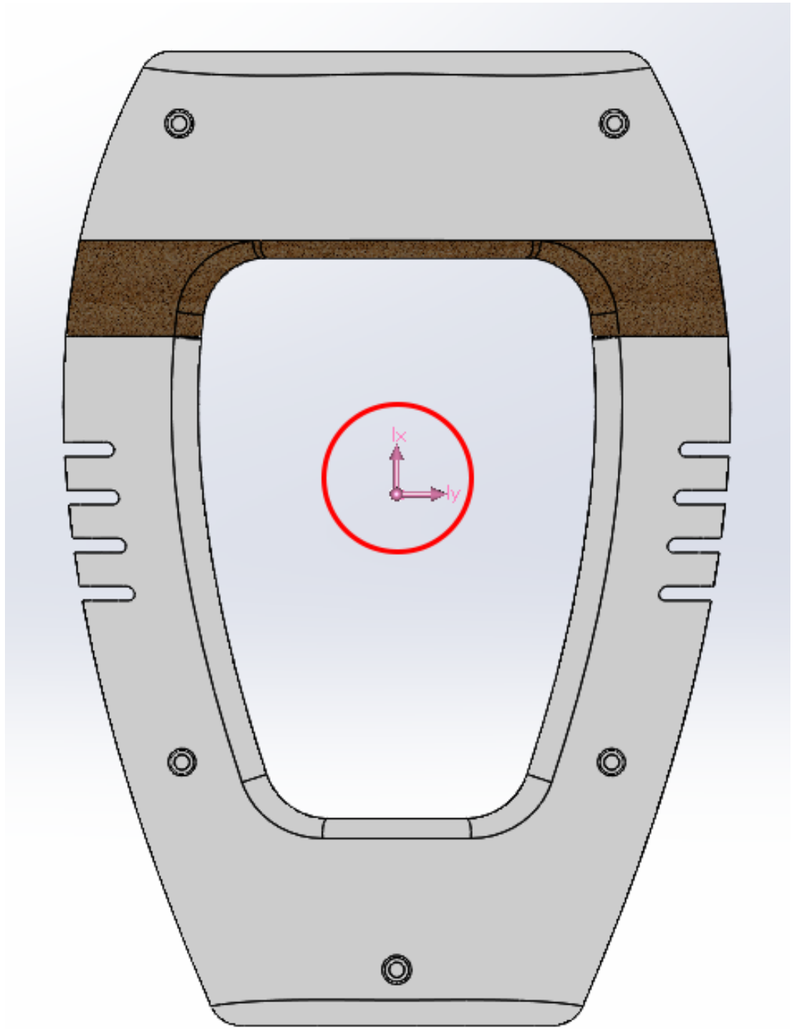
Price / month (2 years) €20 (=Comparable with PHin)

First buoyancy calculations (1)

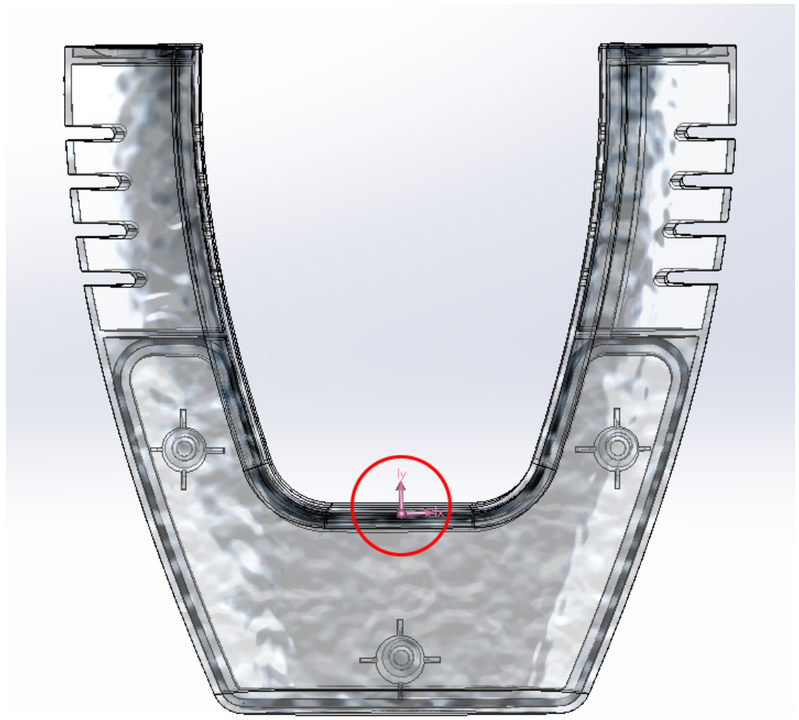
- 1st: Checking if buoyant (Fb*>Fg**)
- 2nd: Determining height waterline + total displaced water
- 3th: Determining total weight buoy (+ eventual ballast)
- 4th: Adapting buoy G*** bellow B**** (better stability)

*Fb = Buoyant Force
**Fg = Gravitation Force
***G= Center of gravity
****B= Center of buoyancy

First buoyancy calculations (2)



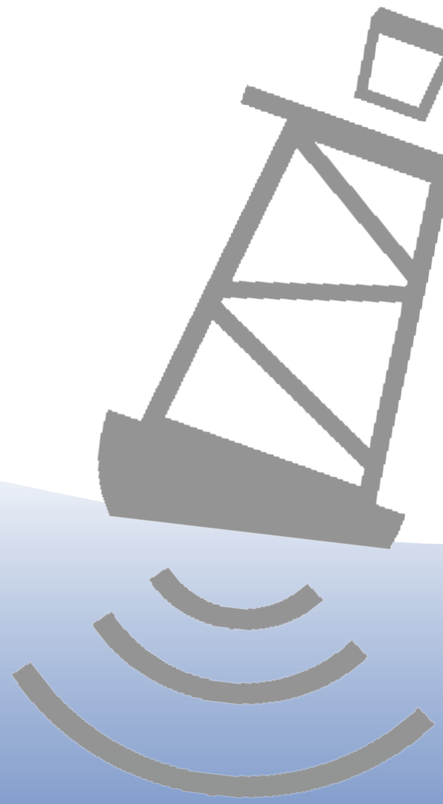
Center of gravity without components*



Center of buoyancy (& water displacement*

*Details see appendix

Questions



- Remark concerning electrical schematic (report)
- Remark concerning “objectives” (report)

Appendix

Center of gravity without components

Mass properties of Assembly buoy 4.0
Configuration: Default
Coordinate system: -- default --

Mass = 291.32 grams

Volume = 285667.74 cubic millimeters

Surface area = 303065.00 square millimeters

Center of mass: (millimeters)
X = 63.50
Y = 8.91
Z = 27.91

Principal axes of inertia and principal moments of inertia: (grams * square millimeters)
Taken at the center of mass.

Ix = (0.00, 1.00, 0.00)	Px = 933894.08
Iy = (-1.00, 0.00, 0.00)	Py = 2142910.49
Iz = (0.00, 0.00, 1.00)	Pz = 2651997.73

Moments of inertia: (grams * square millimeters)
Taken at the center of mass and aligned with the output coordinate system.

Lxx = 2142912.69	Lxy = -308.83	Lxz = 1078.57
Lyx = -308.83	Lyy = 933895.28	Lyz = -1384.94
Lzx = 1078.57	Lzy = -1384.94	Lzz = 2651994.33

Moments of inertia: (grams * square millimeters)
Taken at the output coordinate system.

Ixx = 2392919.23	Ixy = 164510.15	Ixz = 517305.85
Iyx = 164510.15	Iyy = 2335367.31	Iyz = 71052.12
Izx = 517305.85	Izy = 71052.12	Izz = 3849714.66

Center of buoyancy (& water displacement

Mass properties of Assembly buoy volume calcul
Configuration: Water mass
Coordinate system: -- default --

* Includes the mass properties of one or more hidden components/bodies.

Mass = 545.40 grams

Volume = 545402.58 cubic millimeters

Surface area = 205045.20 square millimeters

Center of mass: (millimeters)
X = 63.45
Y = -77.79
Z = 27.78

Principal axes of inertia and principal moments of inertia: (grams * square millimeters)
Taken at the center of mass.

Ix = (1.00, 0.02, 0.00)	Px = 1005827.74
Iy = (-0.02, 1.00, 0.00)	Py = 1129127.73
Iz = (0.00, 0.00, 1.00)	Pz = 1680710.76

Moments of inertia: (grams * square millimeters)
Taken at the center of mass and aligned with the output coordinate system.

Lxx = 1005905.85	Lxy = 3076.76	Lxz = 948.64
Lyx = 3076.76	Lyy = 1129051.57	Lyz = -579.11
Lzx = 948.64	Lzy = -579.11	Lzz = 1680708.81

Moments of inertia: (grams * square millimeters)
Taken at the output coordinate system.

Ixx = 4727402.08	Ixy = -2689137.54	Ixz = 962175.92
Iyx = -2689137.54	Iyy = 3745704.02	Iyz = -1179070.00
Izx = 962175.92	Izy = -1179070.00	Izz = 7177321.52