Perfilômetro

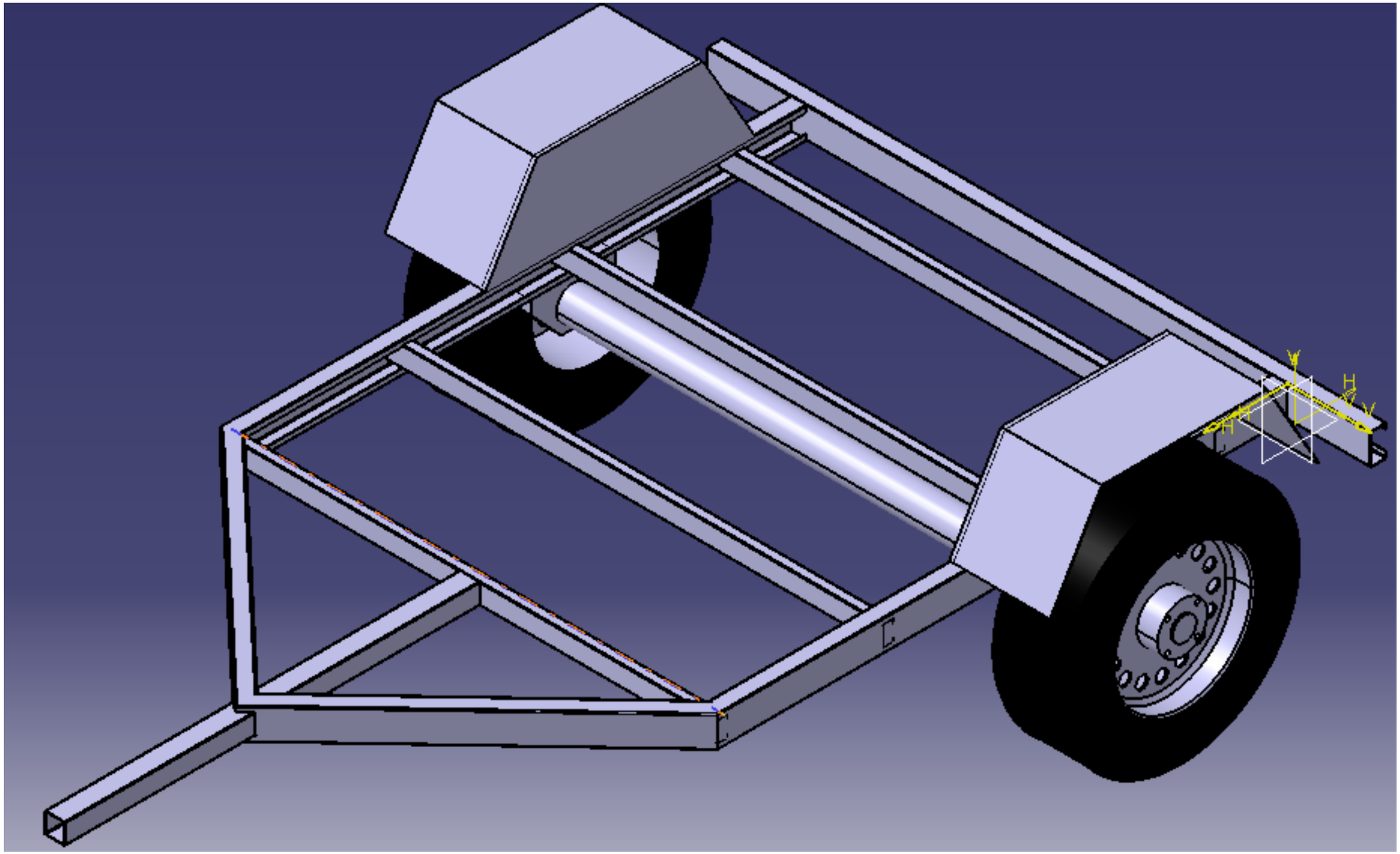
Adolfo Serique

Antonino Martins

Geovanni Oliveira

Miguel Pimentel

Vitor Umpierre



Como estamos?

Software

ANTES

- Aplicativo iOS;

Software

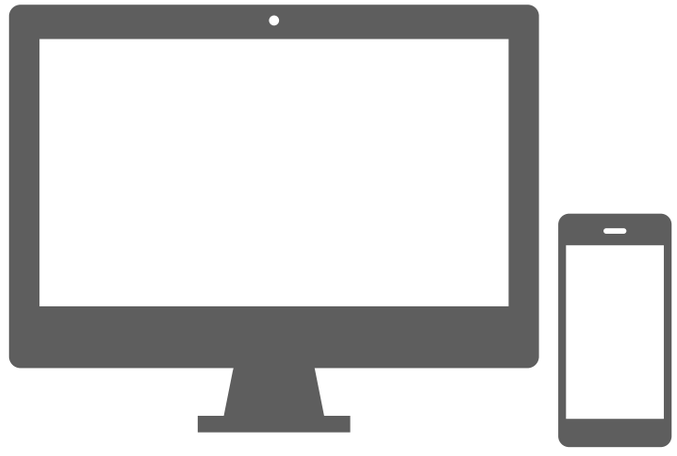
ANTES

- Aplicativo iOS;

Software

AGORA

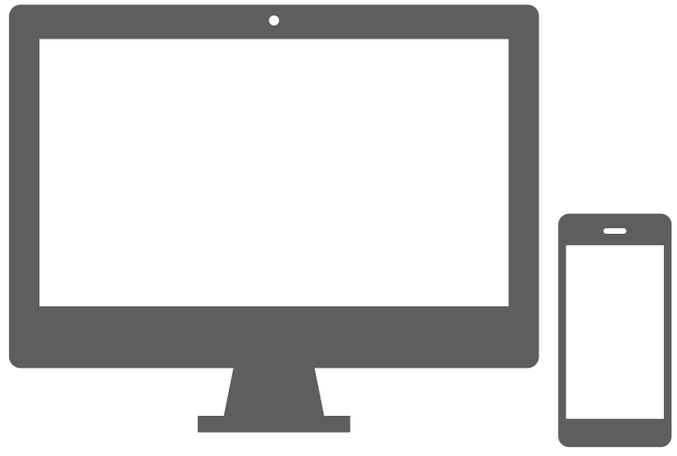
- Aplicativo iOS;
- Servidor centralizador NodeJS;
- Servidor em Python;

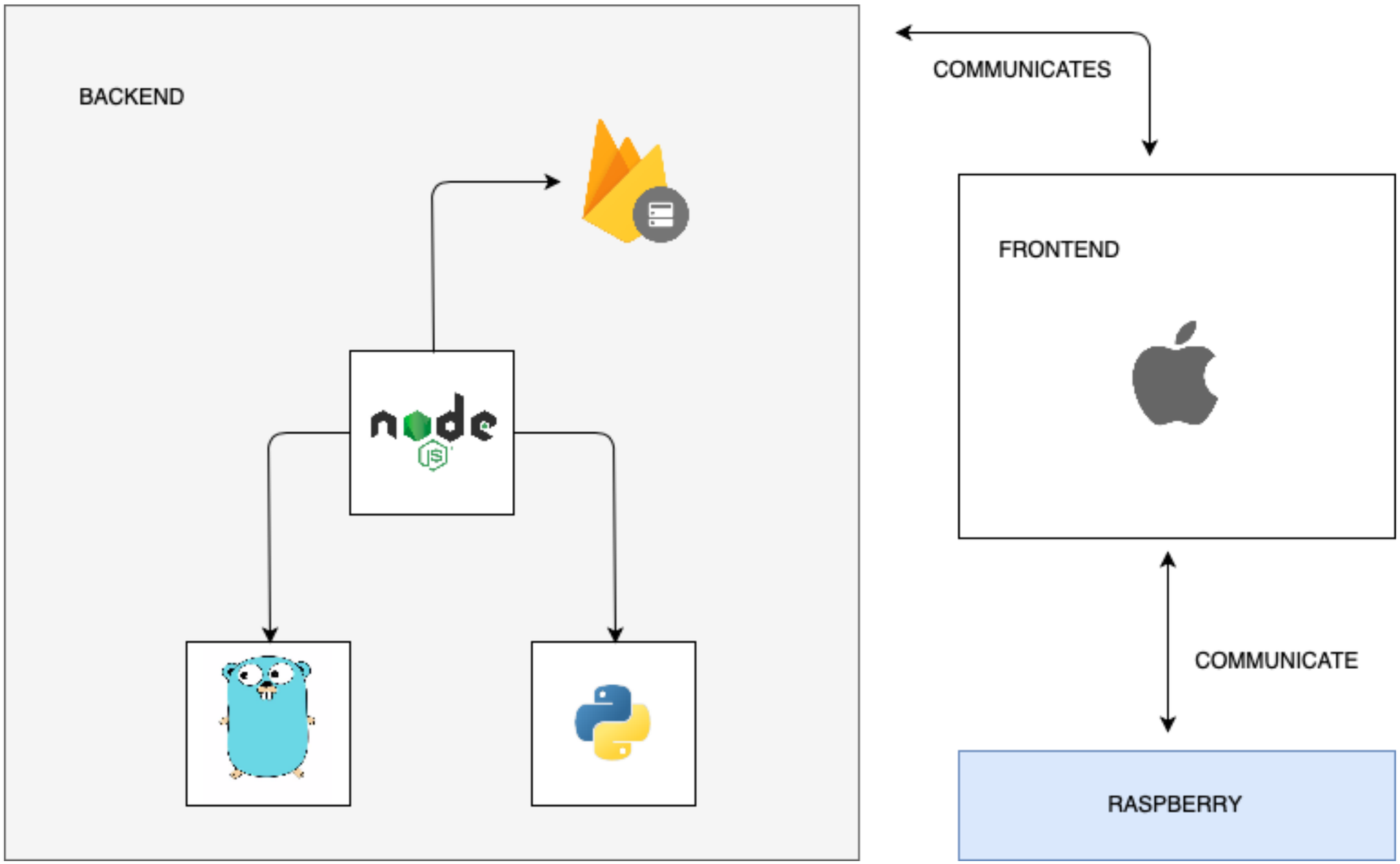


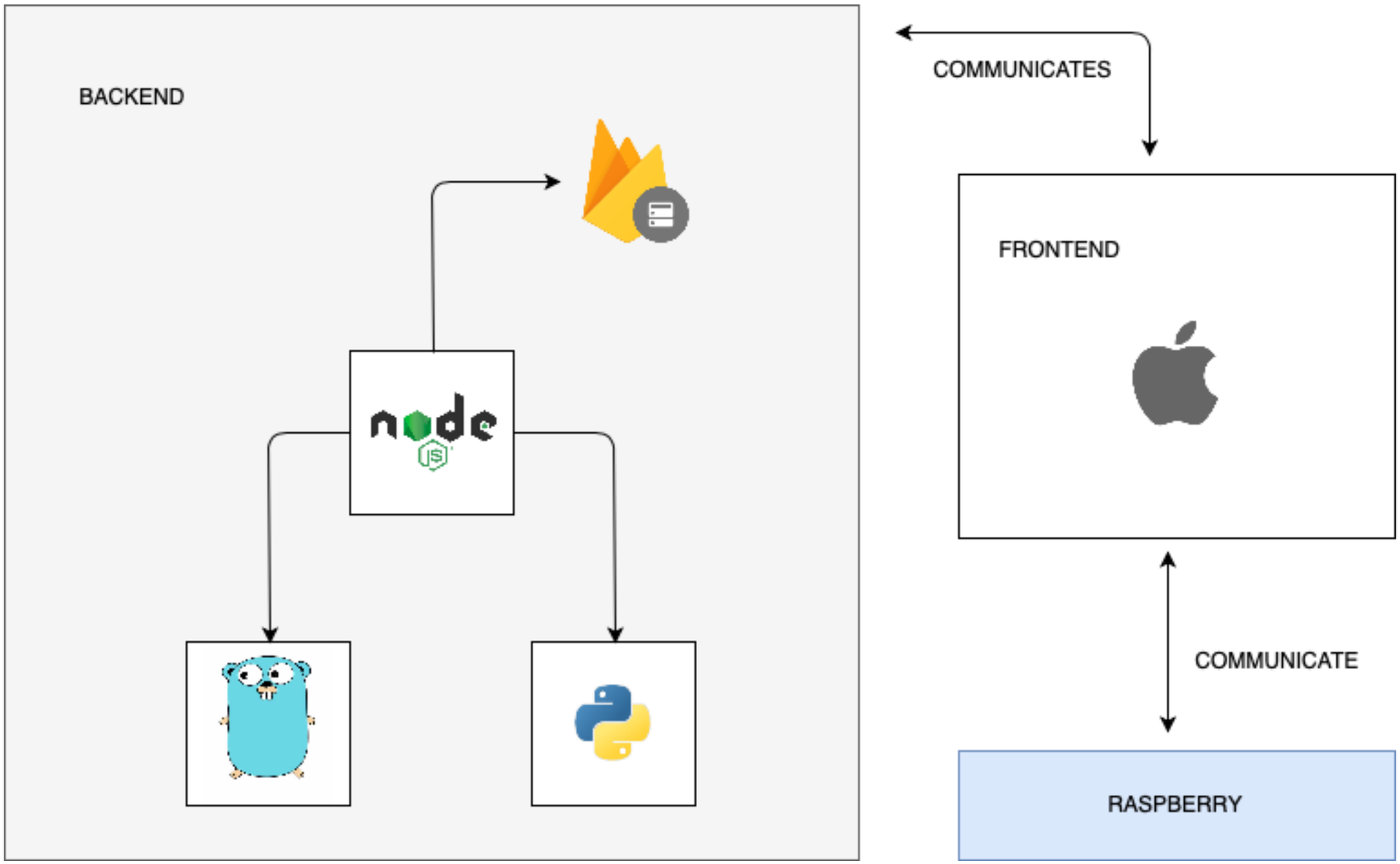
Software

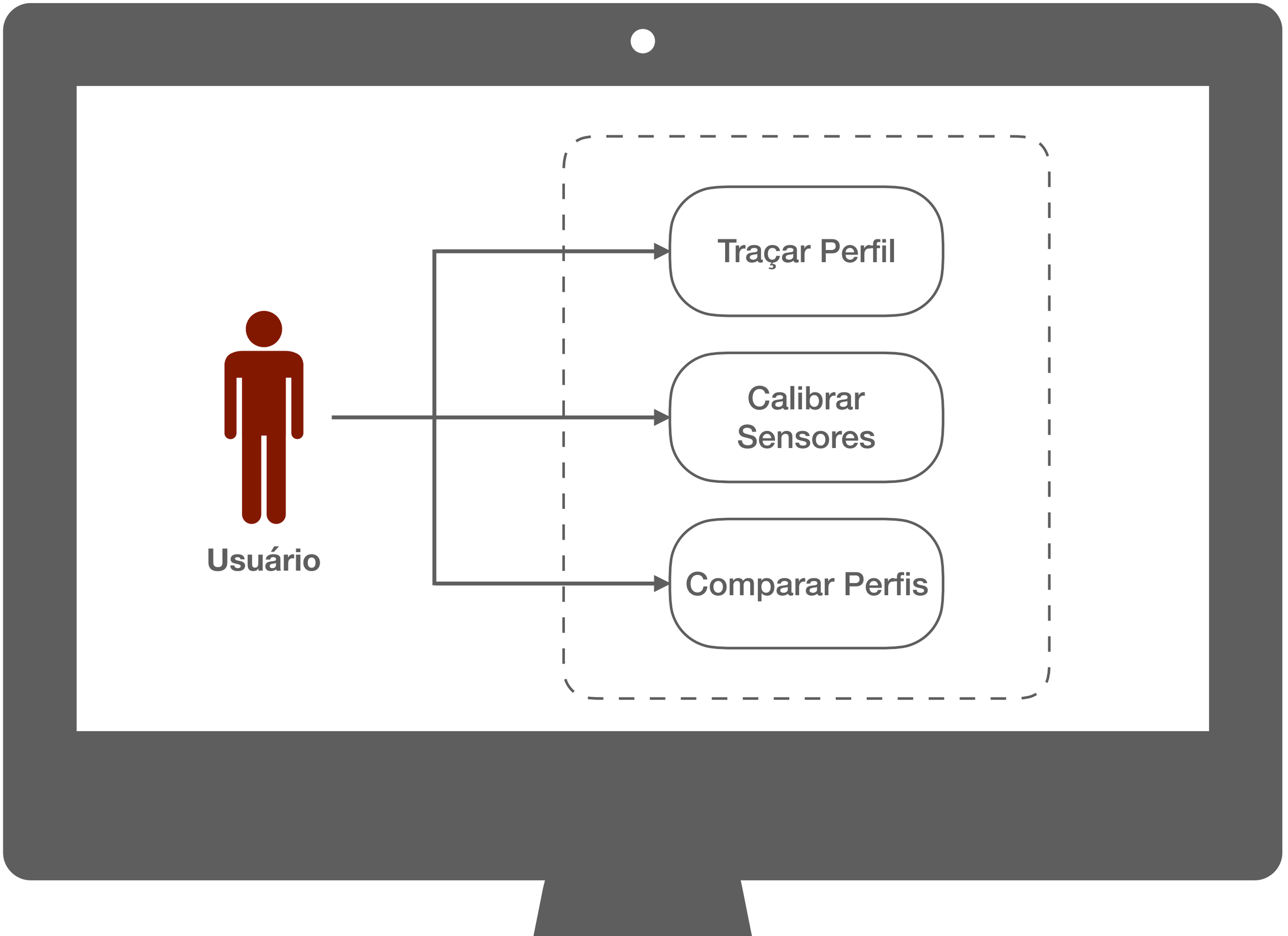
AGORA

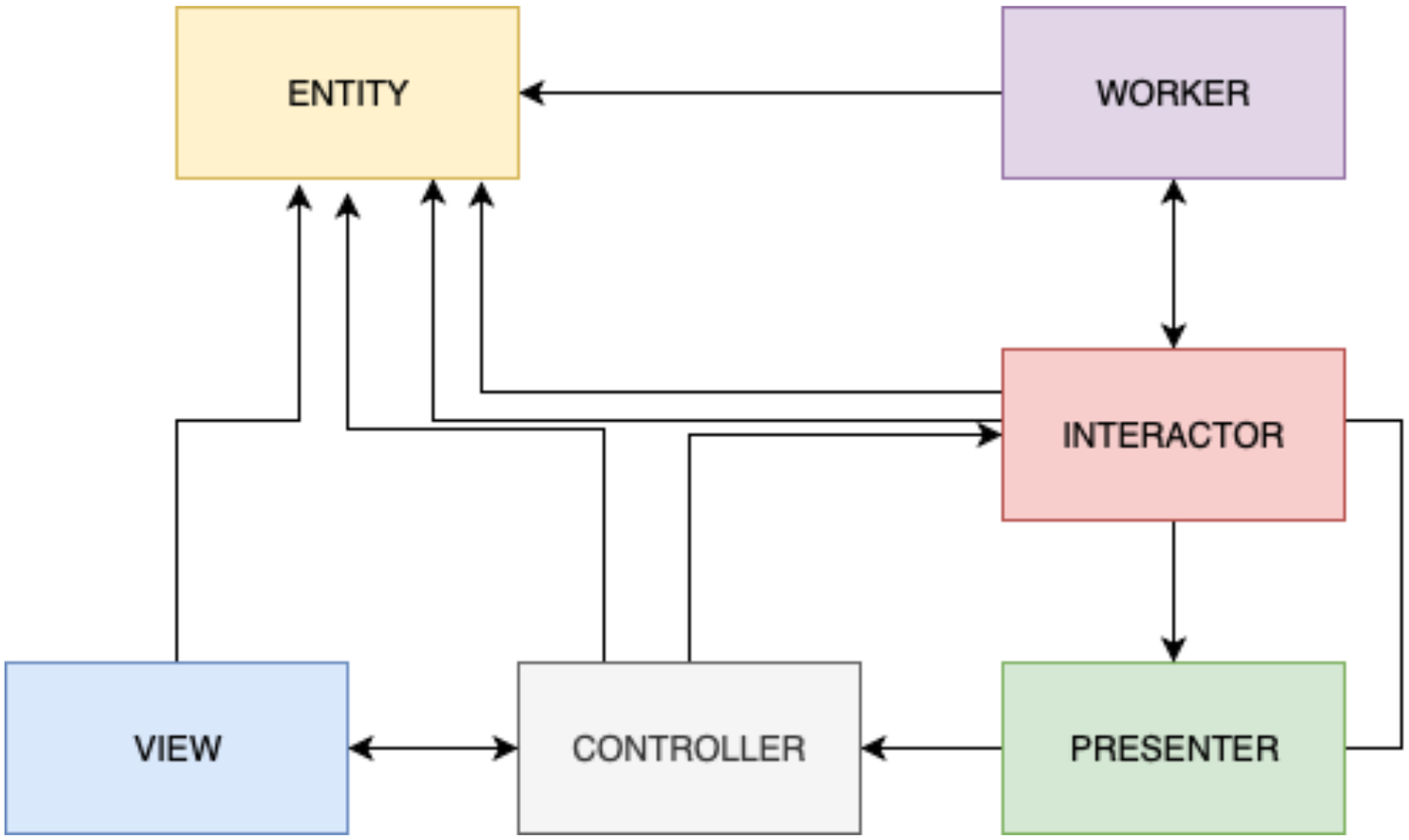
- Aplicativo iOS;
- Servidor centralizador NodeJS;
- Servidor em Python;

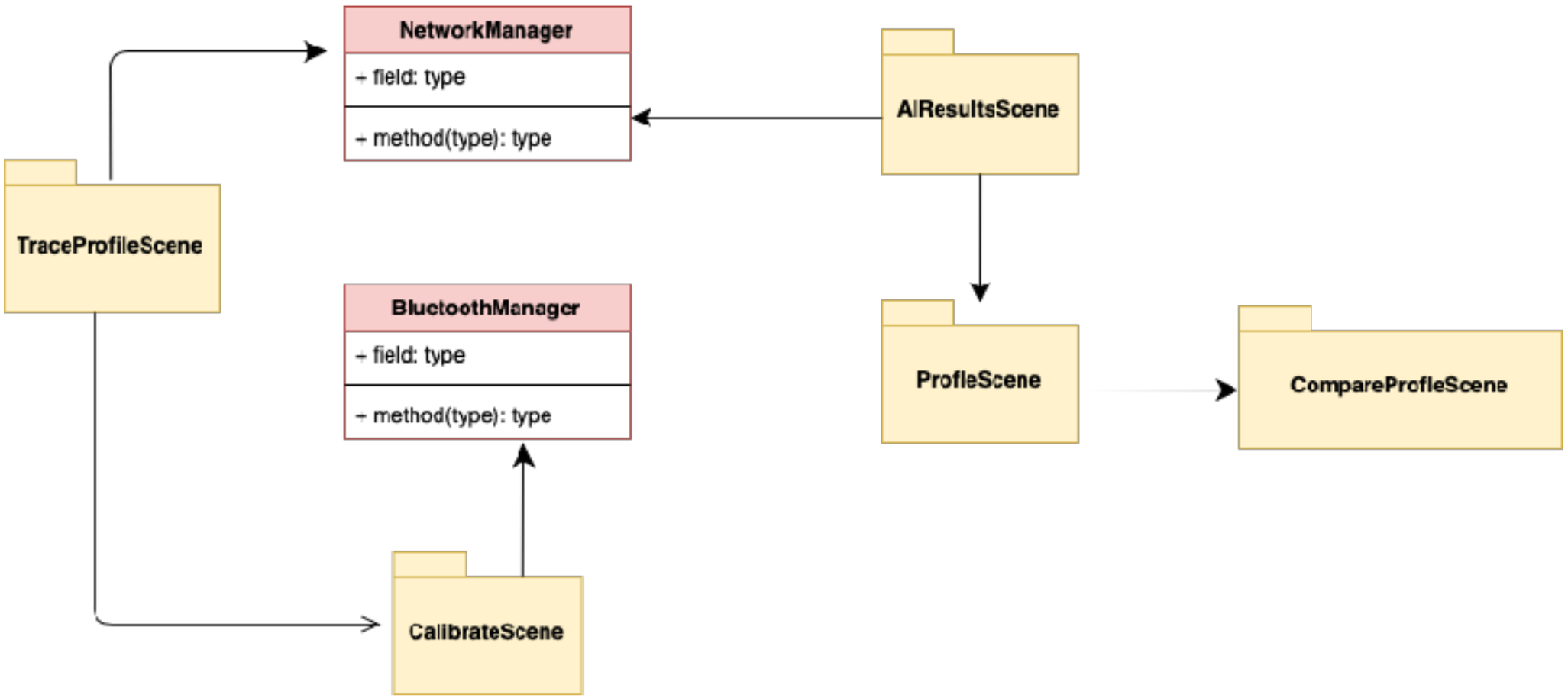


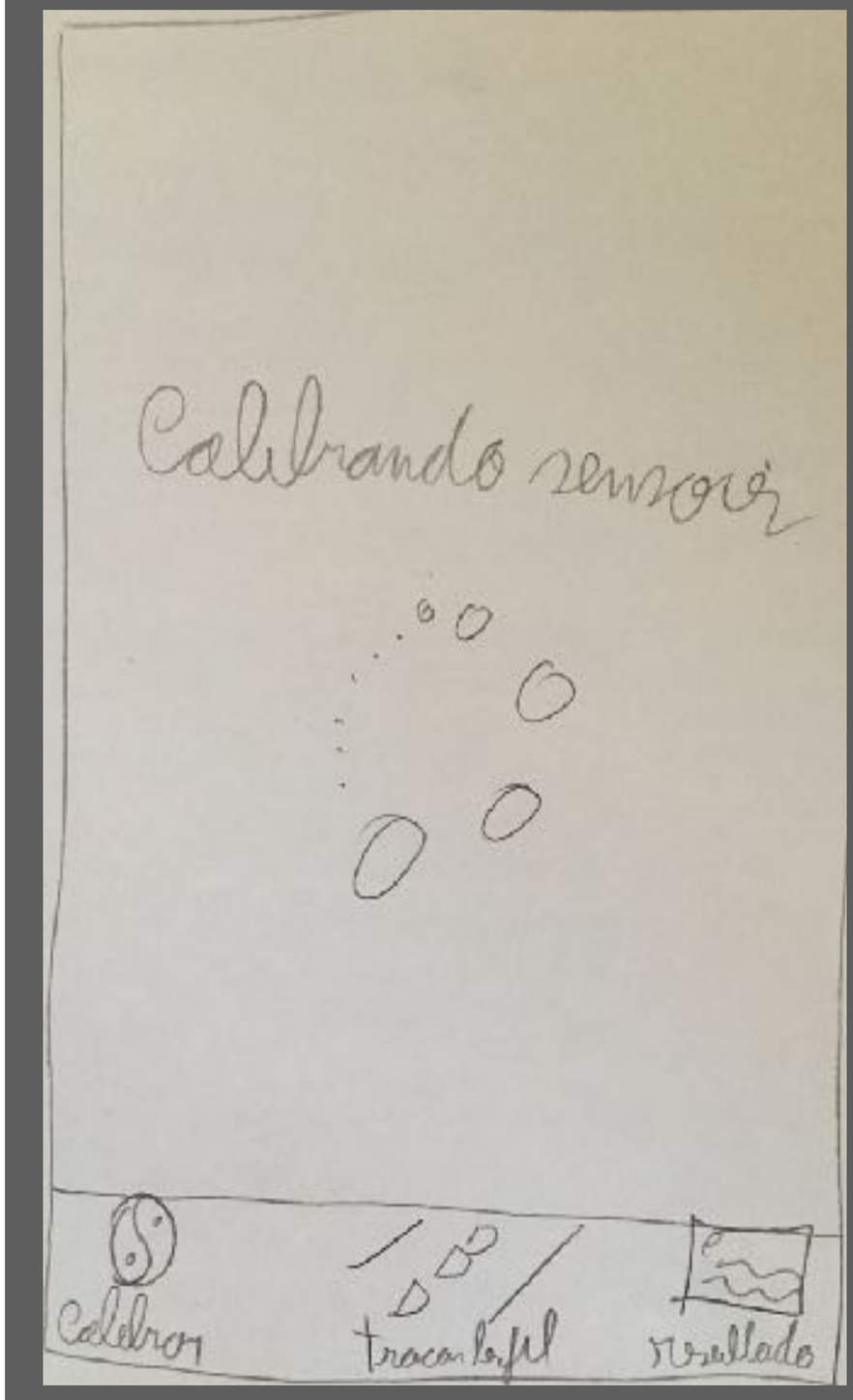

BACKEND
COMMUNICATES
FRONTEND
node
COMMUNICATE
RASPBERRY

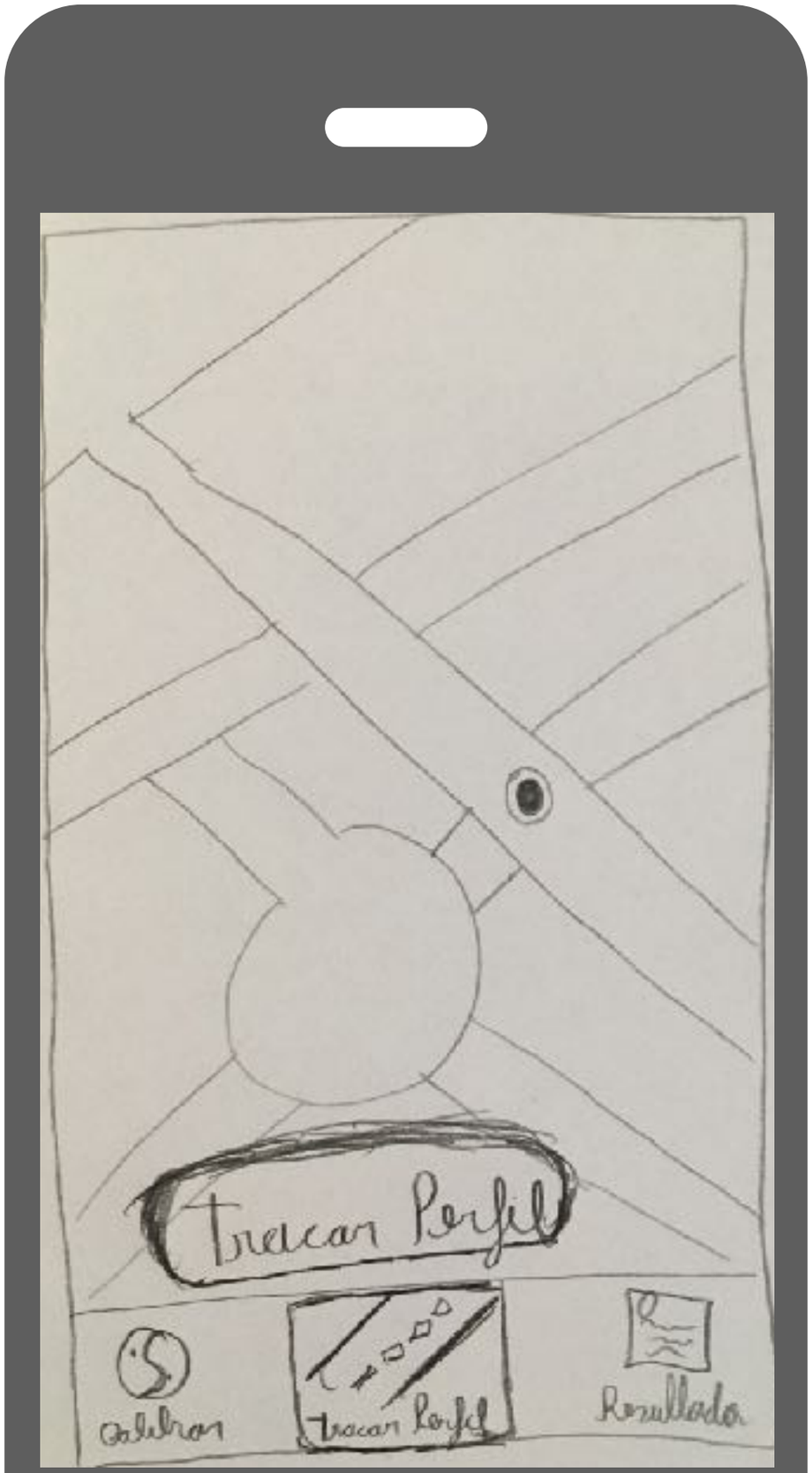

BACKEND
COMMUNICATES
FRONTEND
node
COMMUNICATE
RASPBERRY

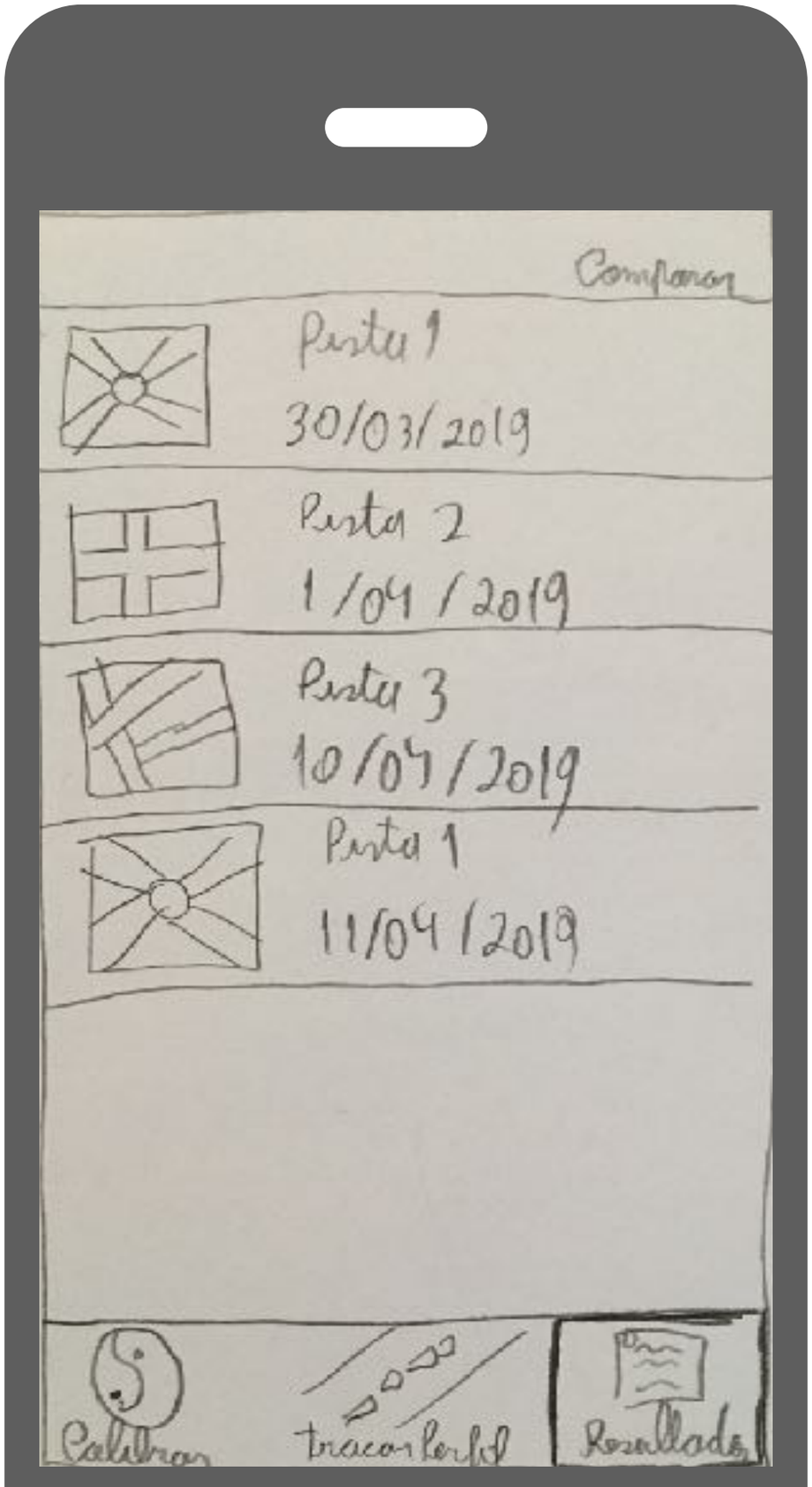

Traçar Perfil
Calibrar Sensores
Comparar Perfis
Usuário

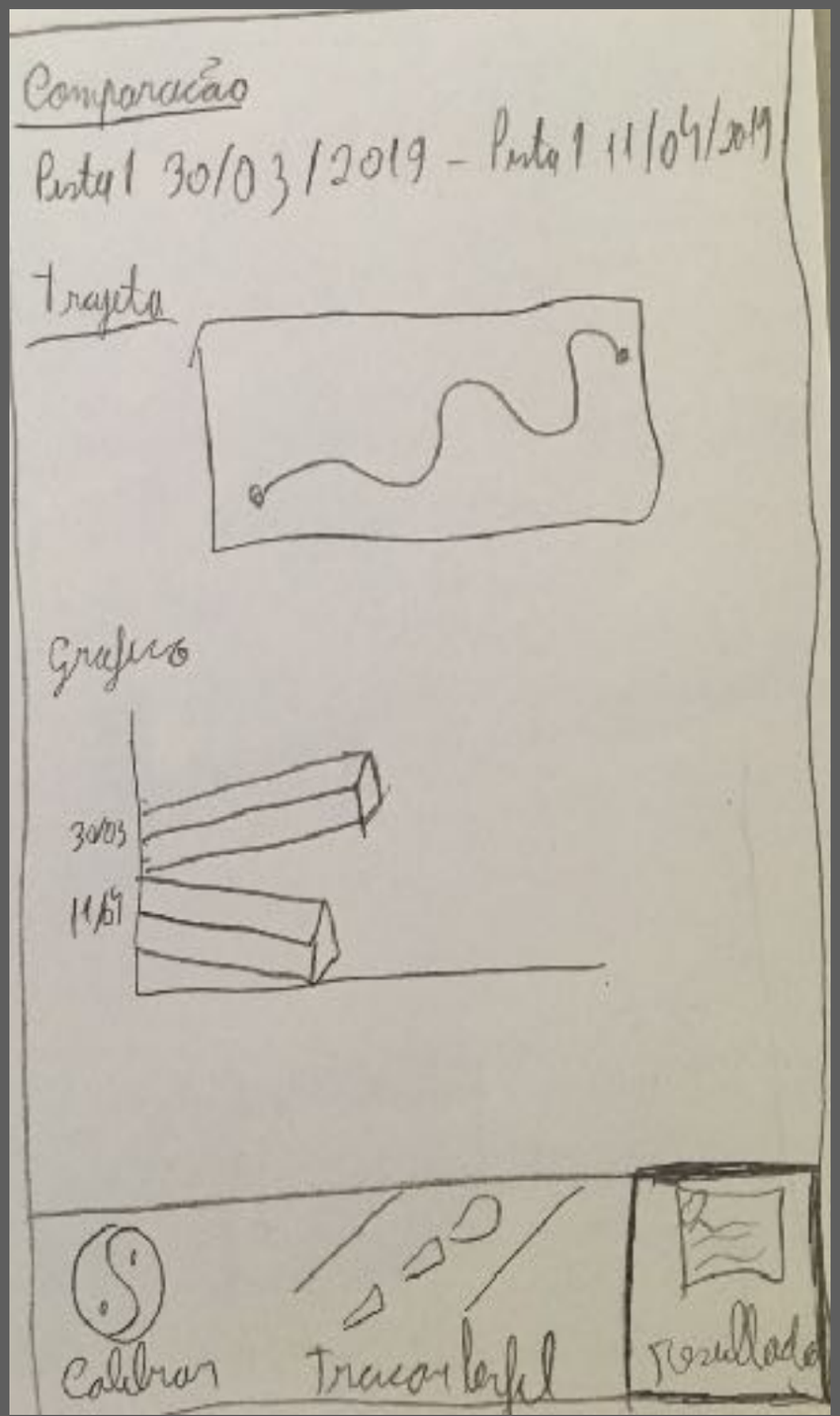

ENTITY
WORKER
INTERACTOR
VIEW
CONTROLLER
PRESENTER

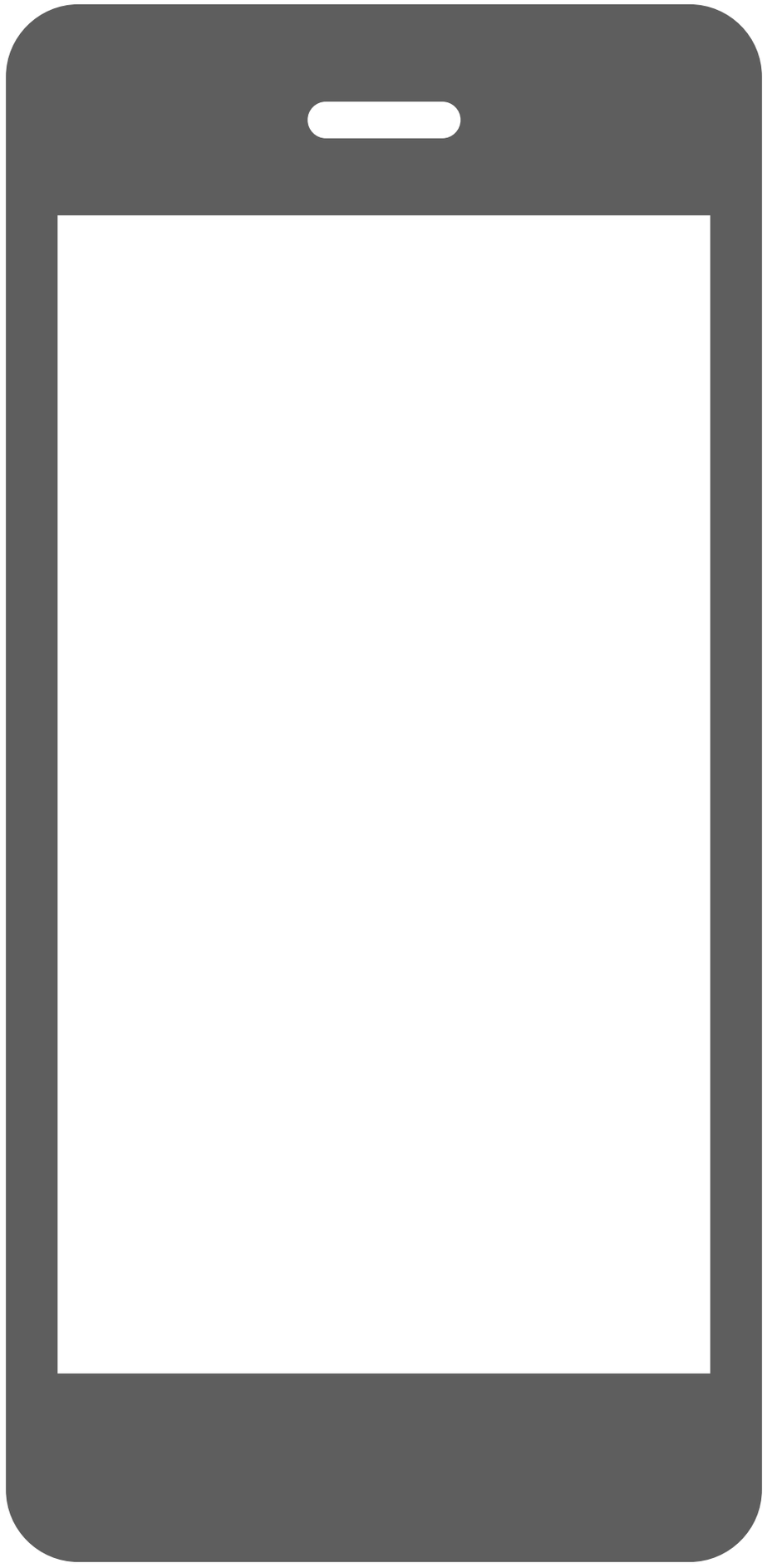

NetworkManager
+ field: type
+ method(type): type
AlResultsScene
TraceProfileScene
BluetoothManager
+ field: type
+ method(type): type
ProfleScene
CompareProfleScene
CalibrateScene


Calibrando sensores
Calebron
Trocanterfil
Resultado


Trocar Perfil
Calibrar
Trocar Perfil
Rematado


Comparar
Pista 1
30/03/2019
Pista 2
1/04/2019
Pista 3
10/04/2019
Pista 1
11/04/2019
Calibrar
Resultados


Comparação
Prata1 30/03/2019 - Prata1 11/04/2019
Trajeto
Gráfico
30/03
11/04
Calibrar
Traçar perfil
Resultado



Eletrônica

- Captação a laser;
- Calibração de ângulo;

Laser VL53l0X

GPS GY-NEO6MV2

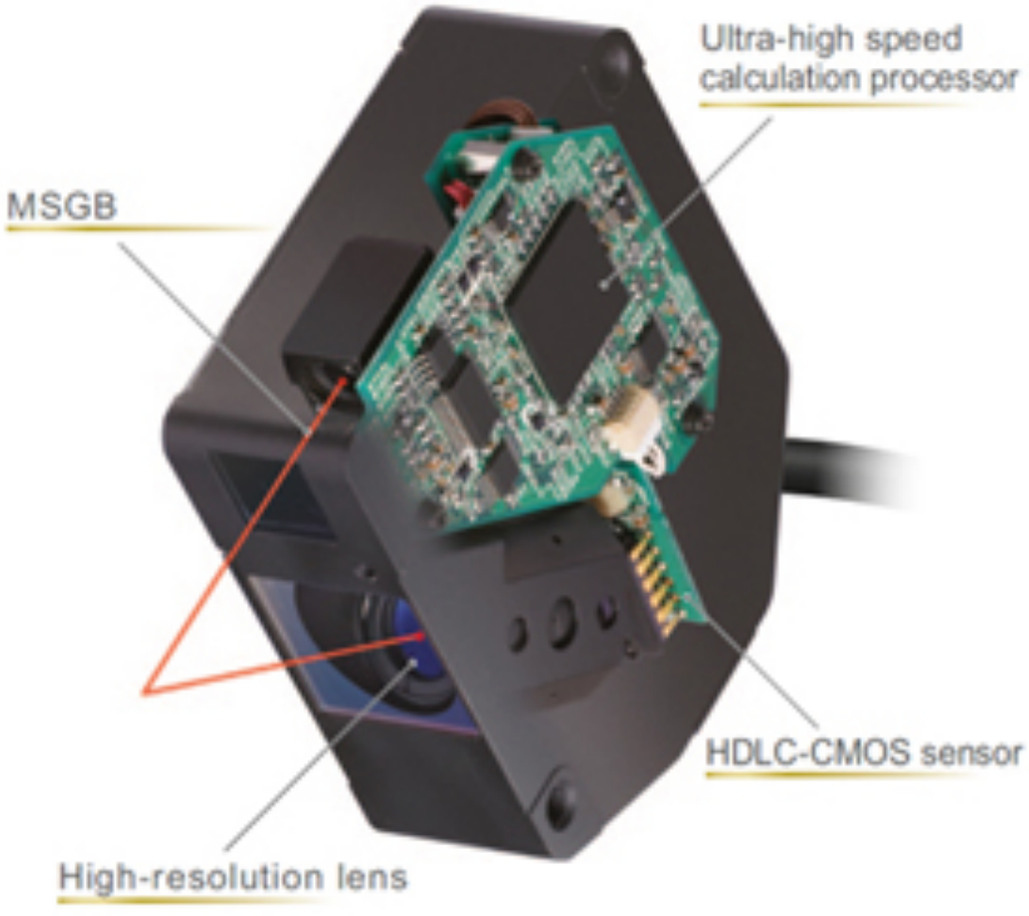
Acelerômetro/Giroscópio MPU-6050

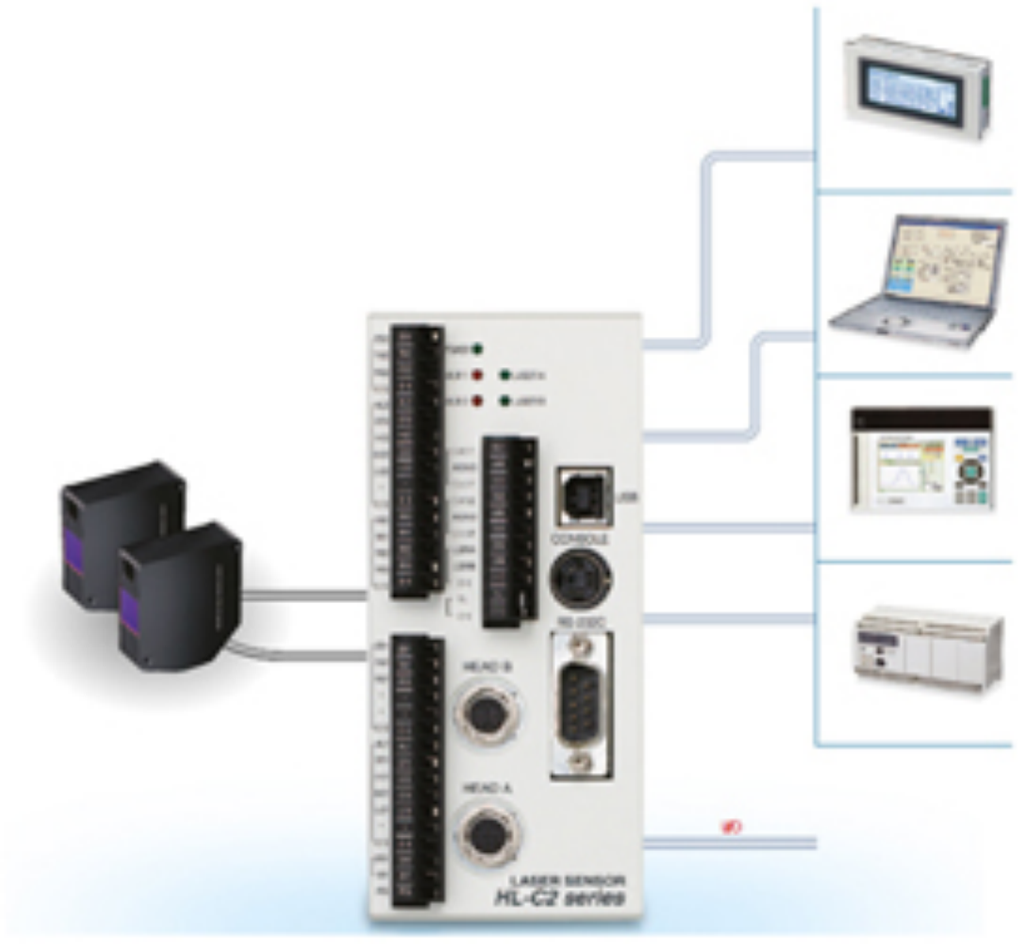
ServoMotor

Eletrônica

Eletrônica

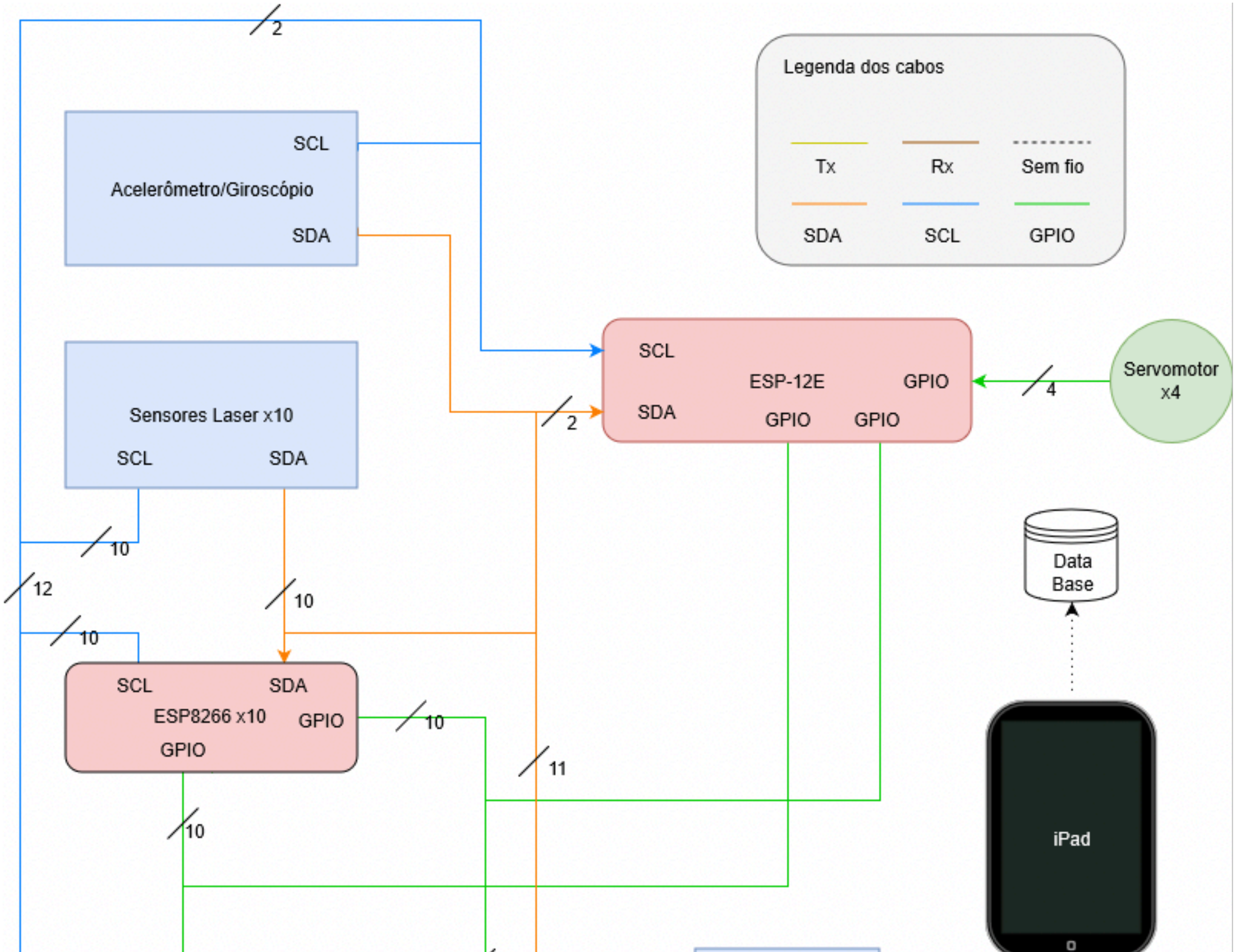
- HL-C2

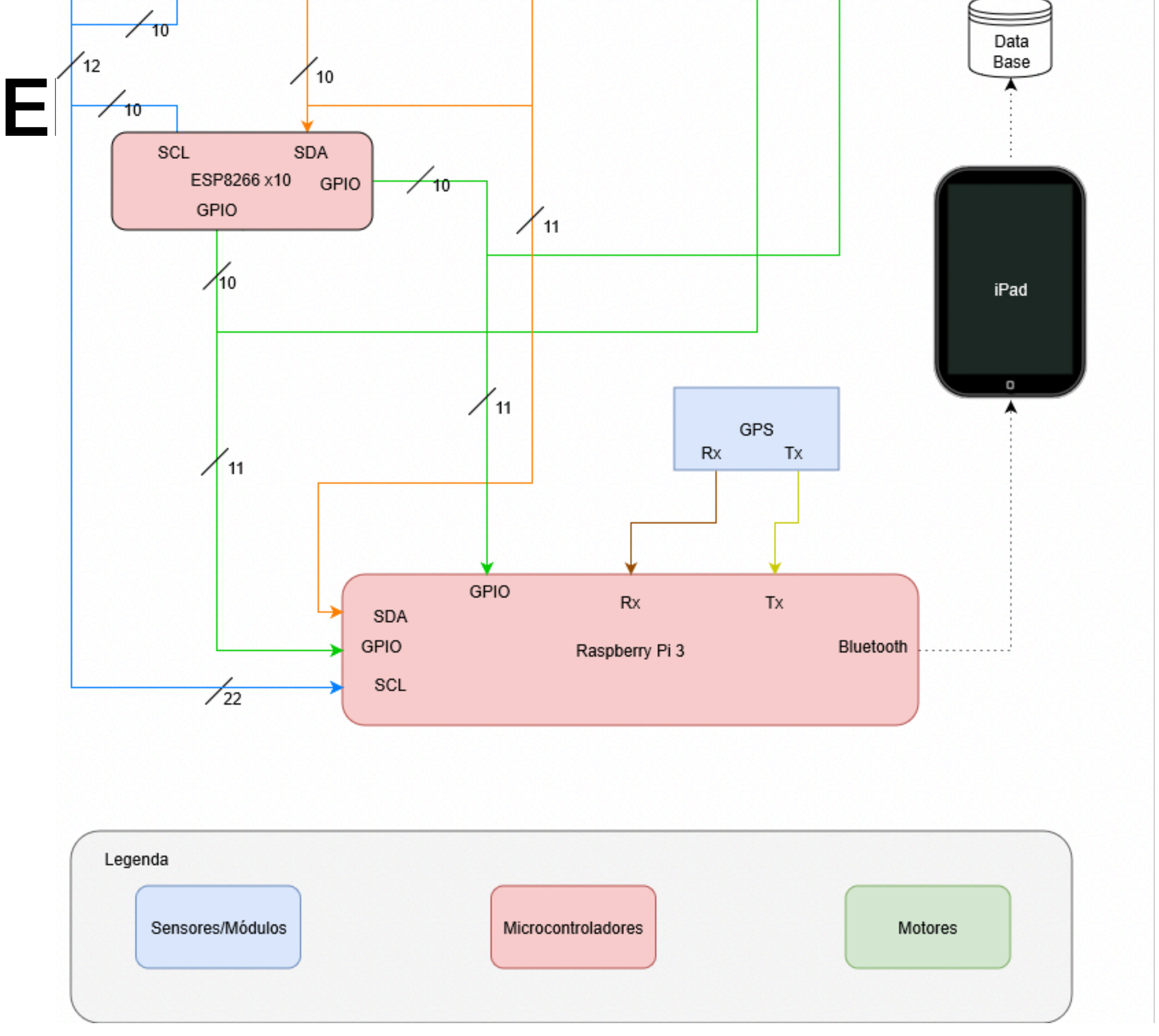




Eletrônica

Eletrônica

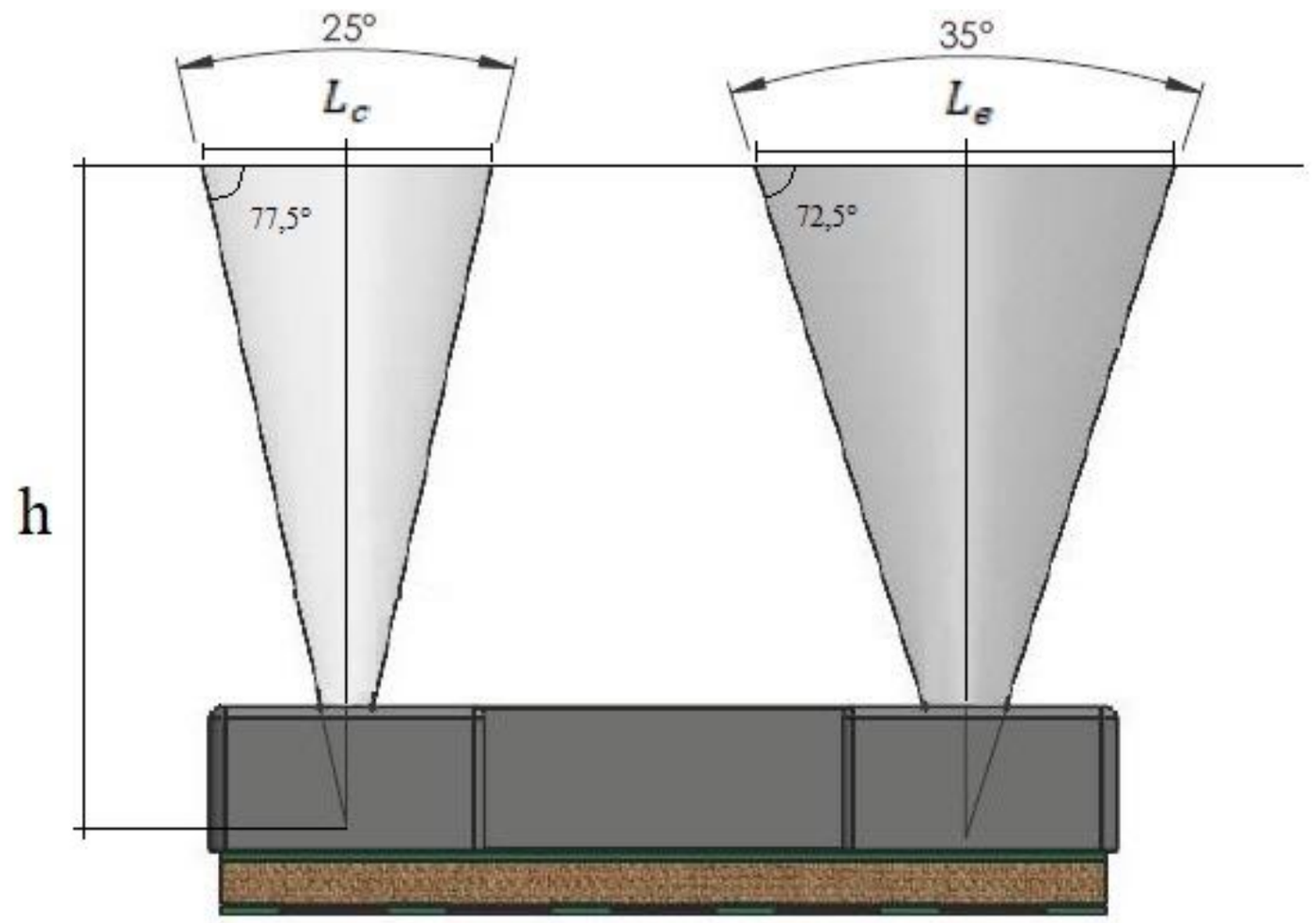

2
SCL
Acelerômetro/Giroscópio
SDA
Sensores Laser x10
SCL
SDA
10
12
10
10
SCL
SDA
ESP8266 x10
GPIO
GPIO
10
10
Legenda dos cabos
Tx
Rx
Sem fio
SDA
SCL
GPIO
SCL
ESP-12E
GPIO
SDA
GPIO
GPIO
2
4
Servomotor
x4
11
Data
Base
iPad


Data Base
iPad
12
10
10
10
SCL
SDA
ESP8266 x10
GPIO
GPIO
GPIO
10
11
10
11
11
GPS
Rx
Tx
GPIO
Rx
Tx
SDA
GPIO
Raspberry Pi 3
Bluetooth
SCL
22
Legenda
Sensores/Módulos
Microcontroladores
Motores

Eletrônica

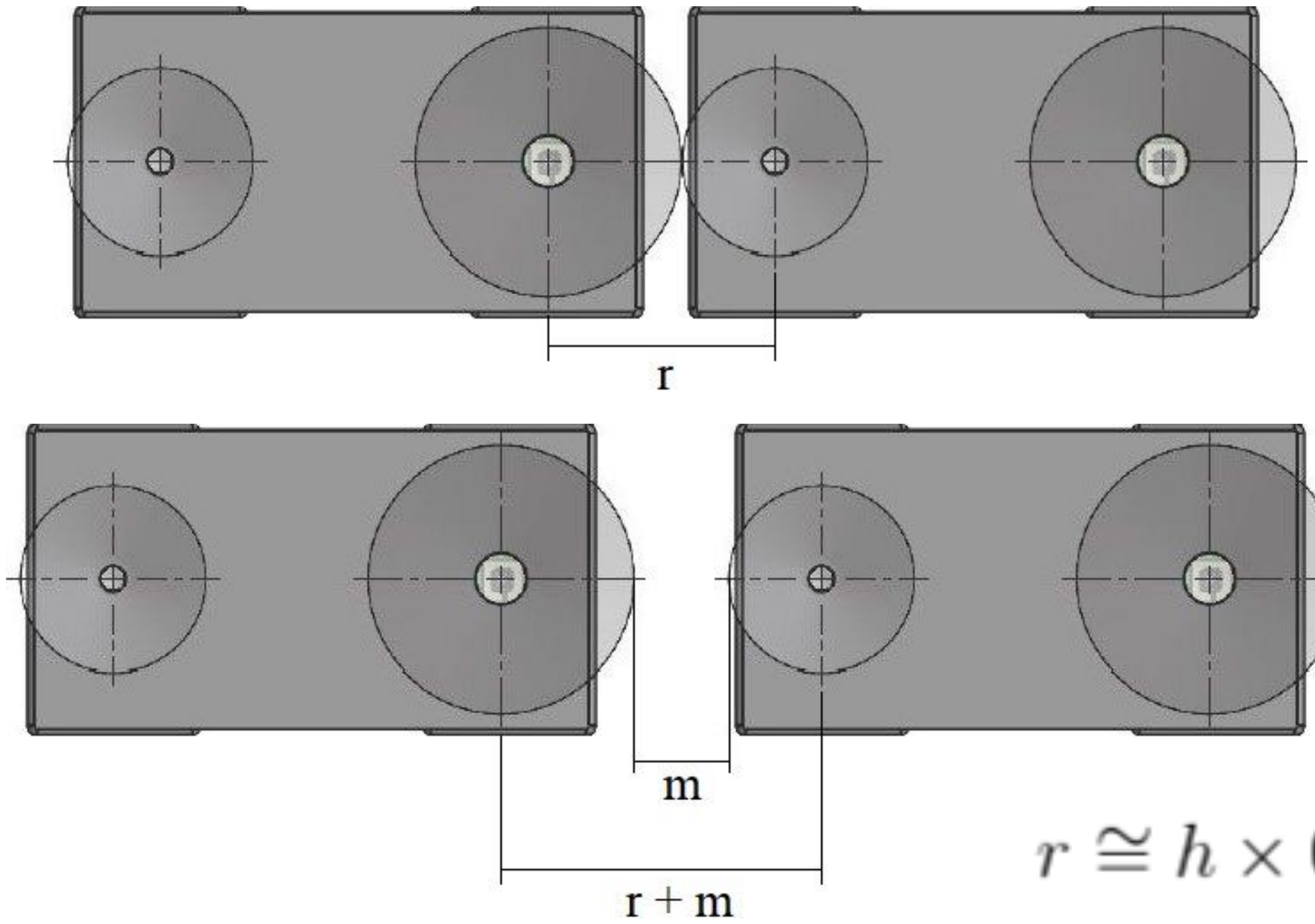
Eletrônica

- Calculo de distância entre sensores



Eletrônica

- Calculo de distância entre sensores



$$r \cong h \times 0.537$$

Eletrônica

Eletrônica

Cálculo de velocidade máxima

$$v = \frac{2^{(n-1)} \times w}{t}$$

Cálculos de Bits

$$20\ ms = 50\ medidas\ por\ segundo \Rightarrow 50 \times 3 = 150\ bytes/segundo$$

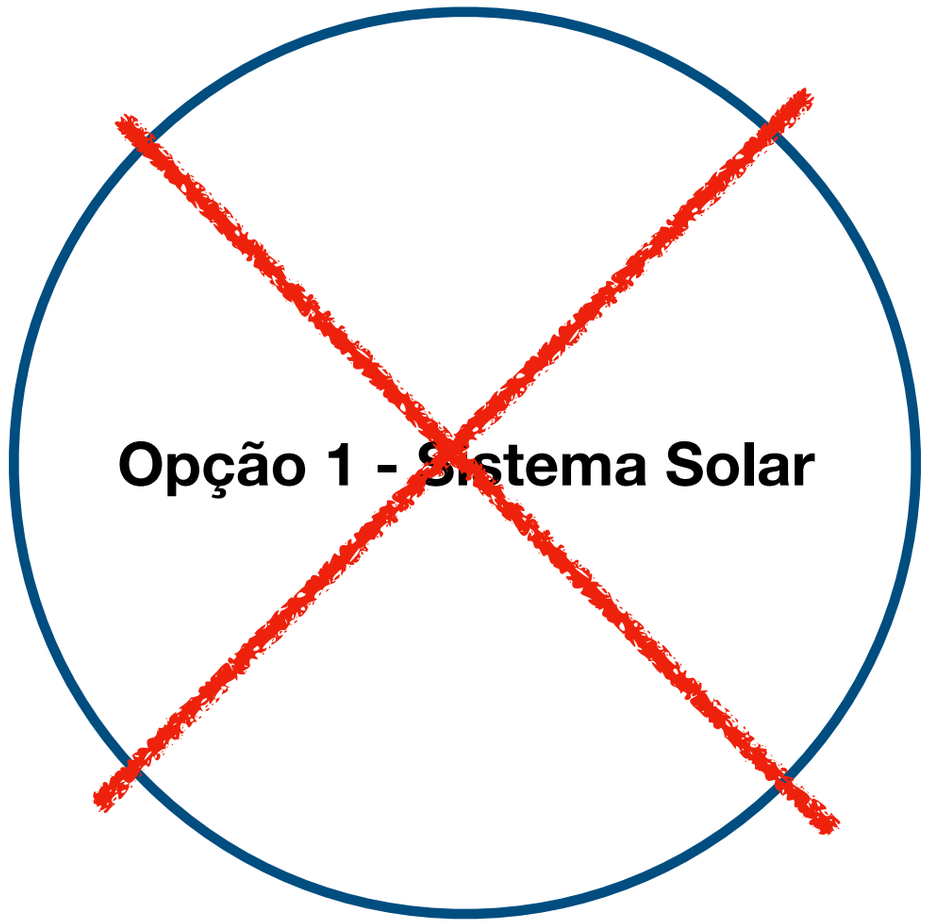
$$150 \times x = 3 \times 10^6 \Rightarrow x = 2 \times 10^4\ segundos$$

Energia

Opção 1 - Sistema Solar

Opção 2 - Gerador Mecânico

Energia

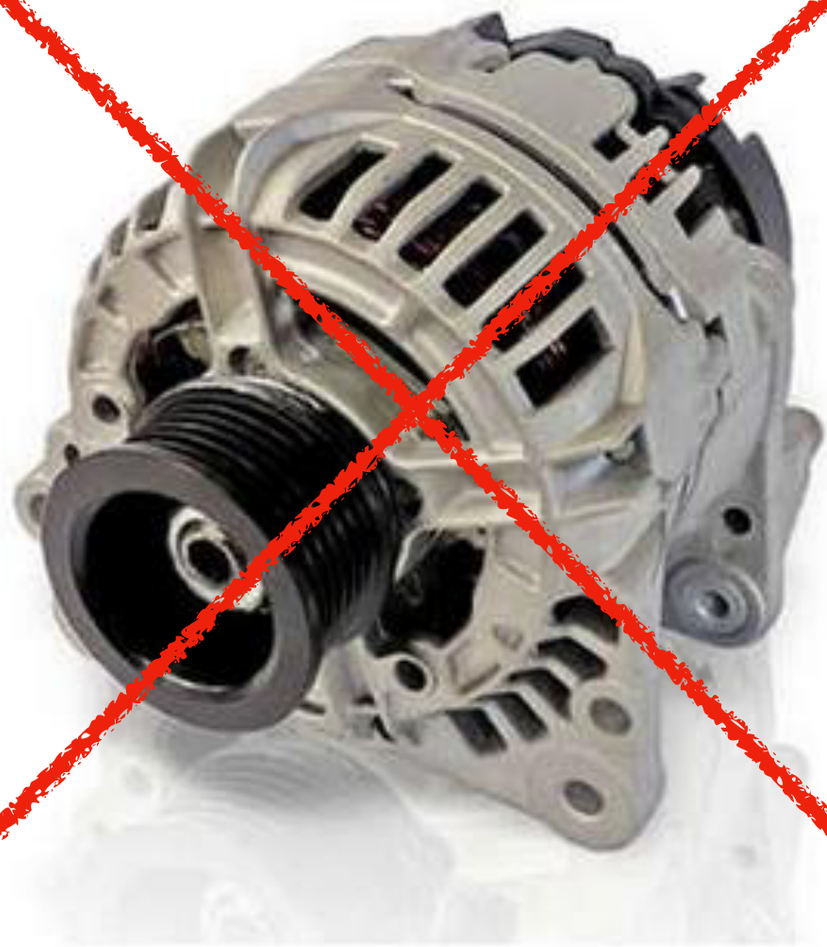


Opção 1 - Sistema Solar

Opção 2 - Gerador Mecânico

Energia

Opção 1 - Sistema



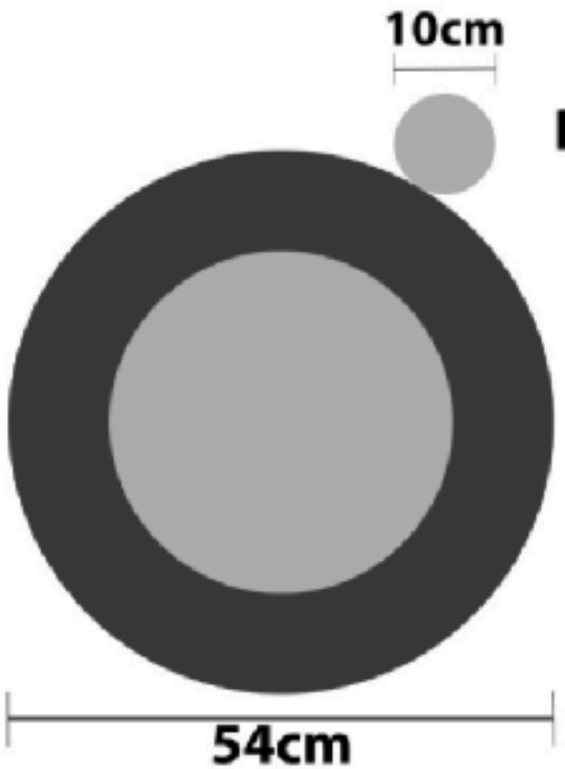
Gerador Mecânico

Energia

Opção 1

lecânico

Energia



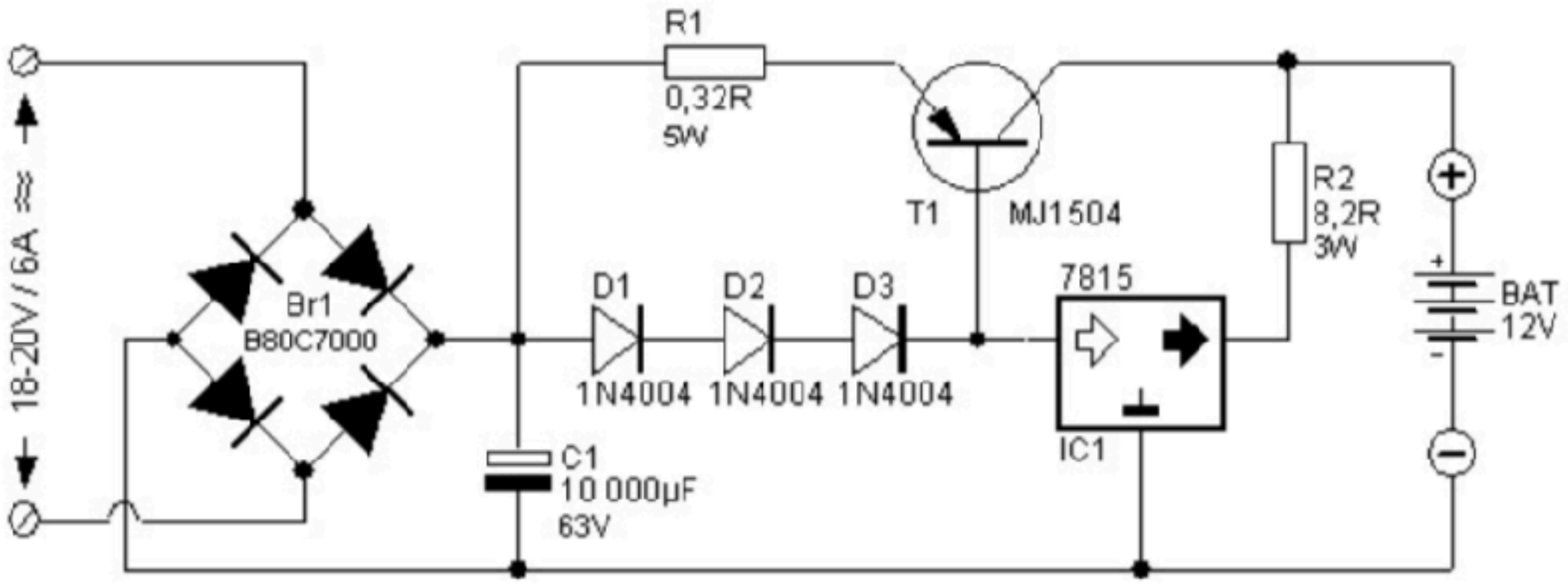
60 km/h = 580 rpm

$$R_1.F_1=R_2.F_2$$

$$580.0,27=0,05.F_2$$

$$F_2=3130 \text{ rpm}$$

Energia


18-20V / 6A
Br1
B80C7000
R1
0,32R
5W
T1
MJ1504
D1
D2
D3
1N4004
1N4004
1N4004
C1
10 000µF
63V
7815
IC1
R2
8,2R
3W
BAT
12V

Estrutura

Segundo o CONTRAN:

- Pode ser fabricado artesanalmente (Artigo 106)
- Deve ser avaliado;
- Pode ser considerado leve (-500kgf) ou pesado

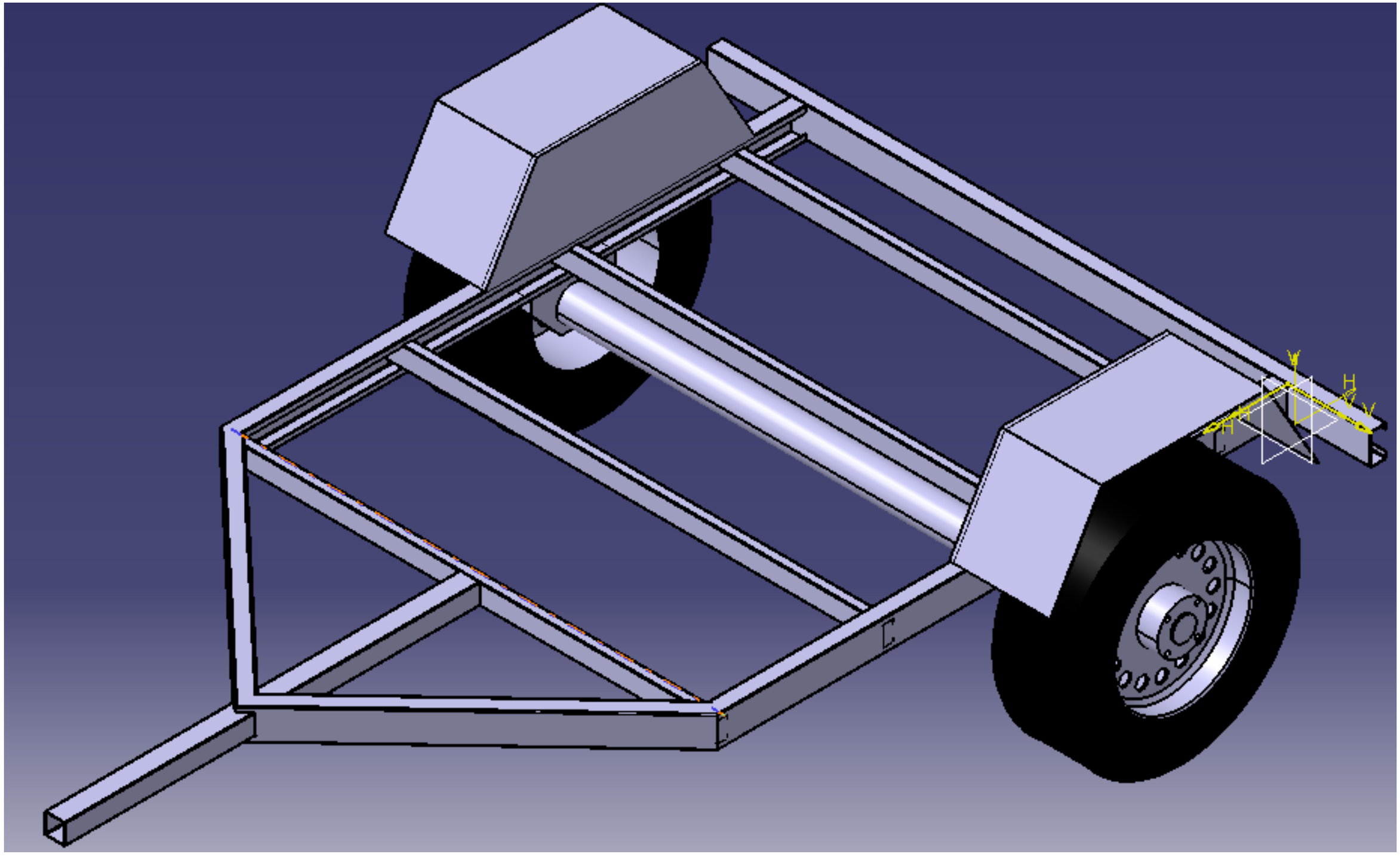
Estrutura

Segundo o CONTRAN:

- Sinalização
- Iluminação
- Direção
- Eixo e suspensão
- Pneus e rodas
- Sistemas de componentes regulamentares

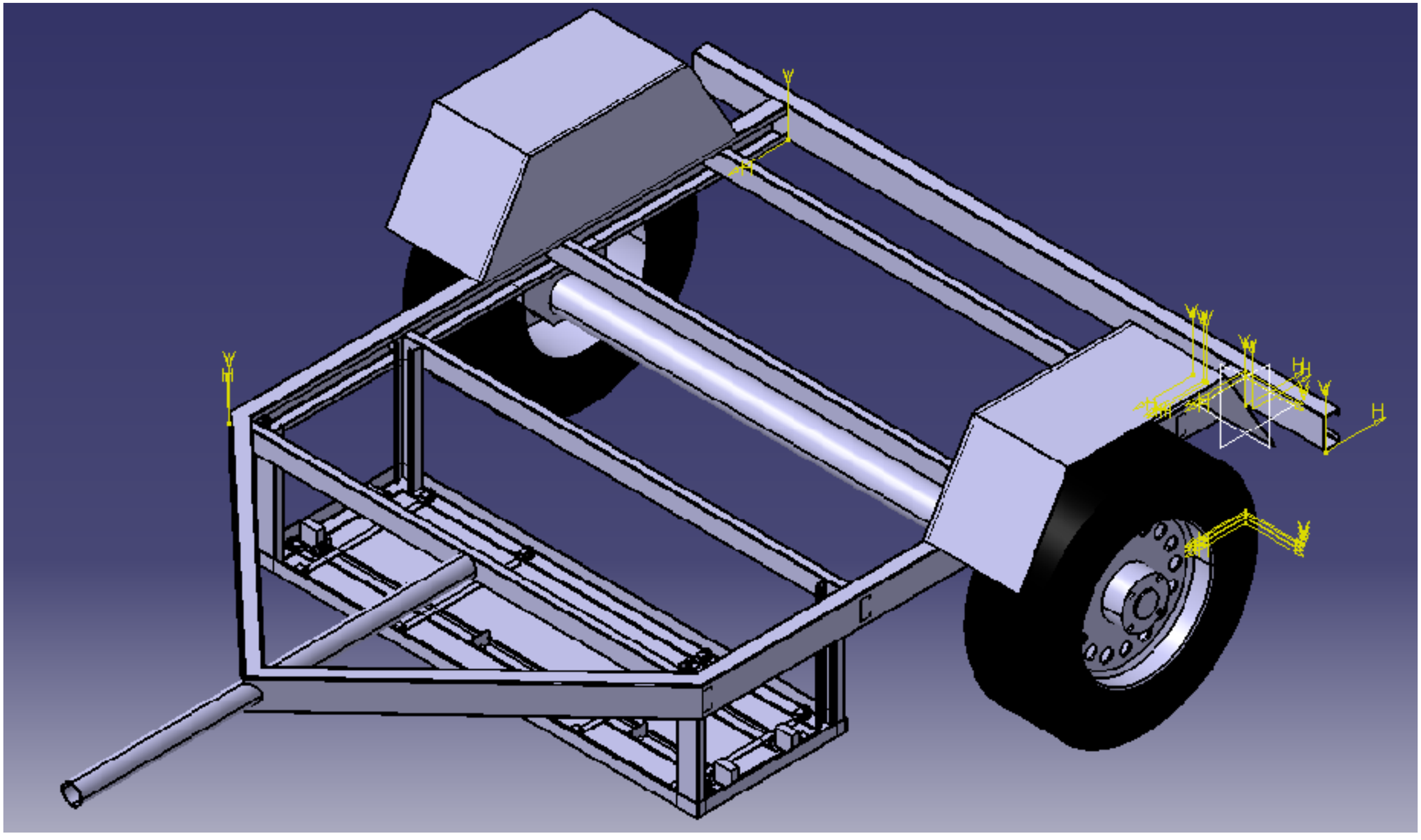
Estrutura

ANTES



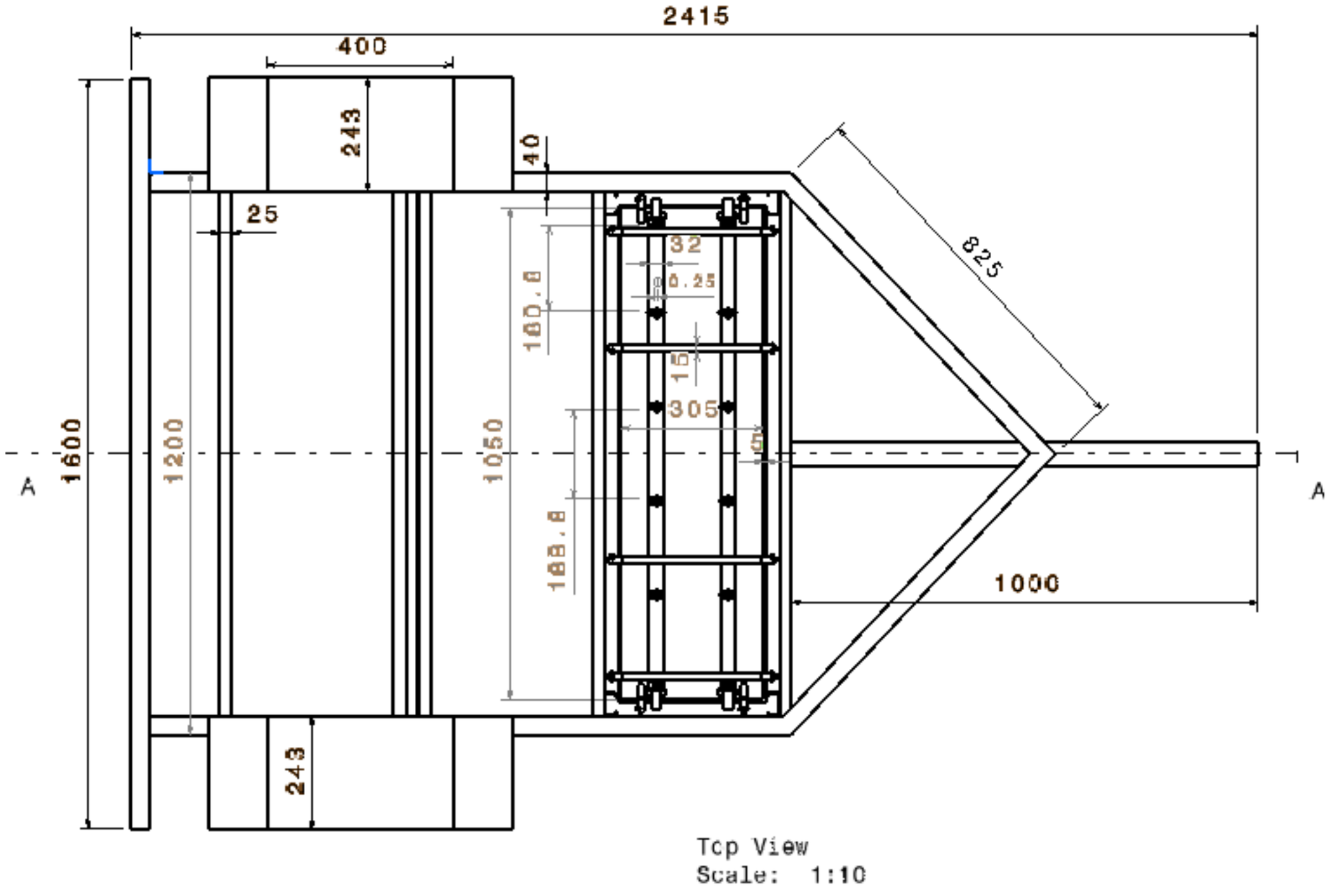
Estrutura

AGORA



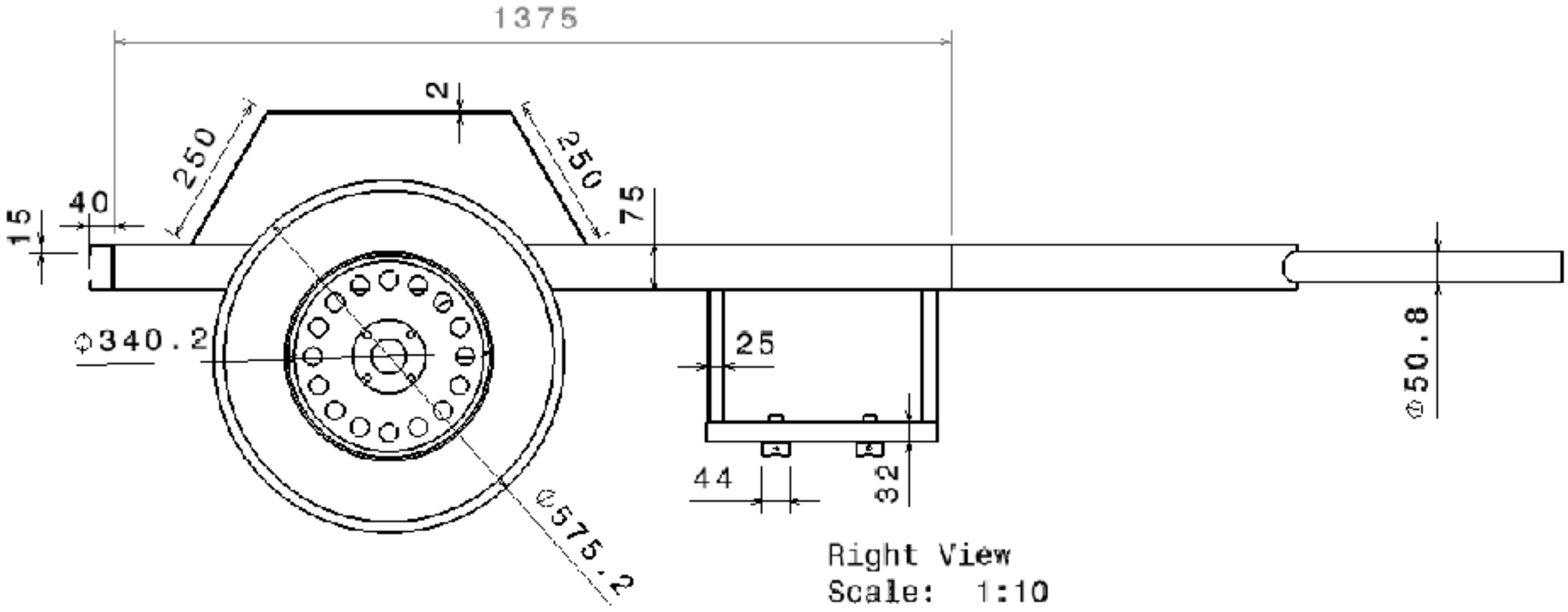
Estrutura

Estrutura



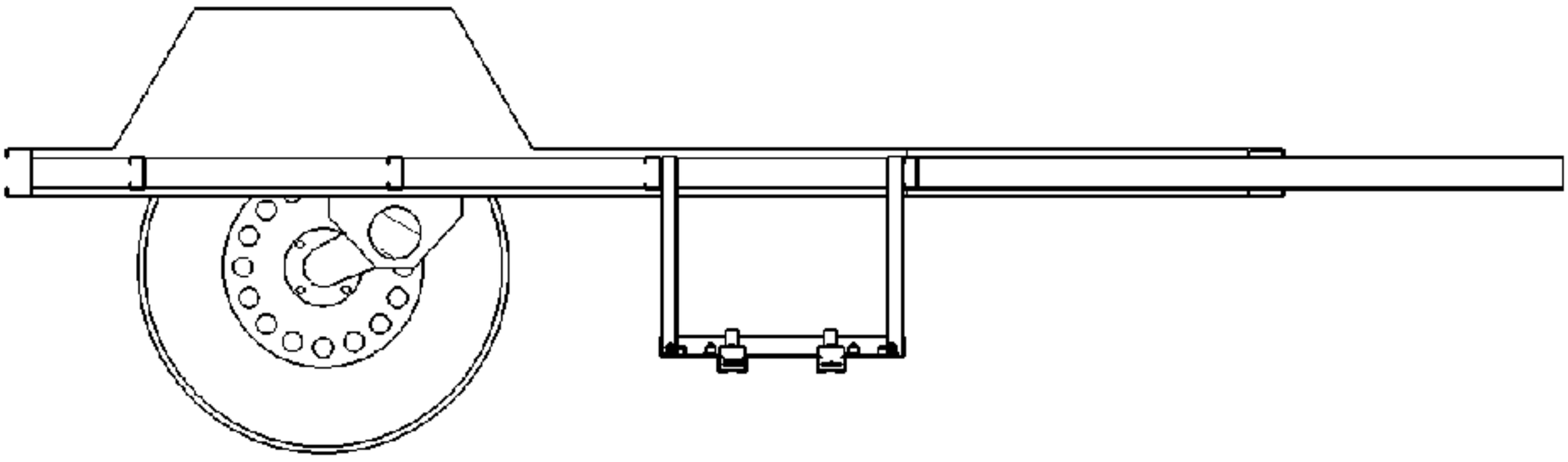
Top View
Scale: 1:10

Estrutura



Right View
Scale: 1:10

Estrutura

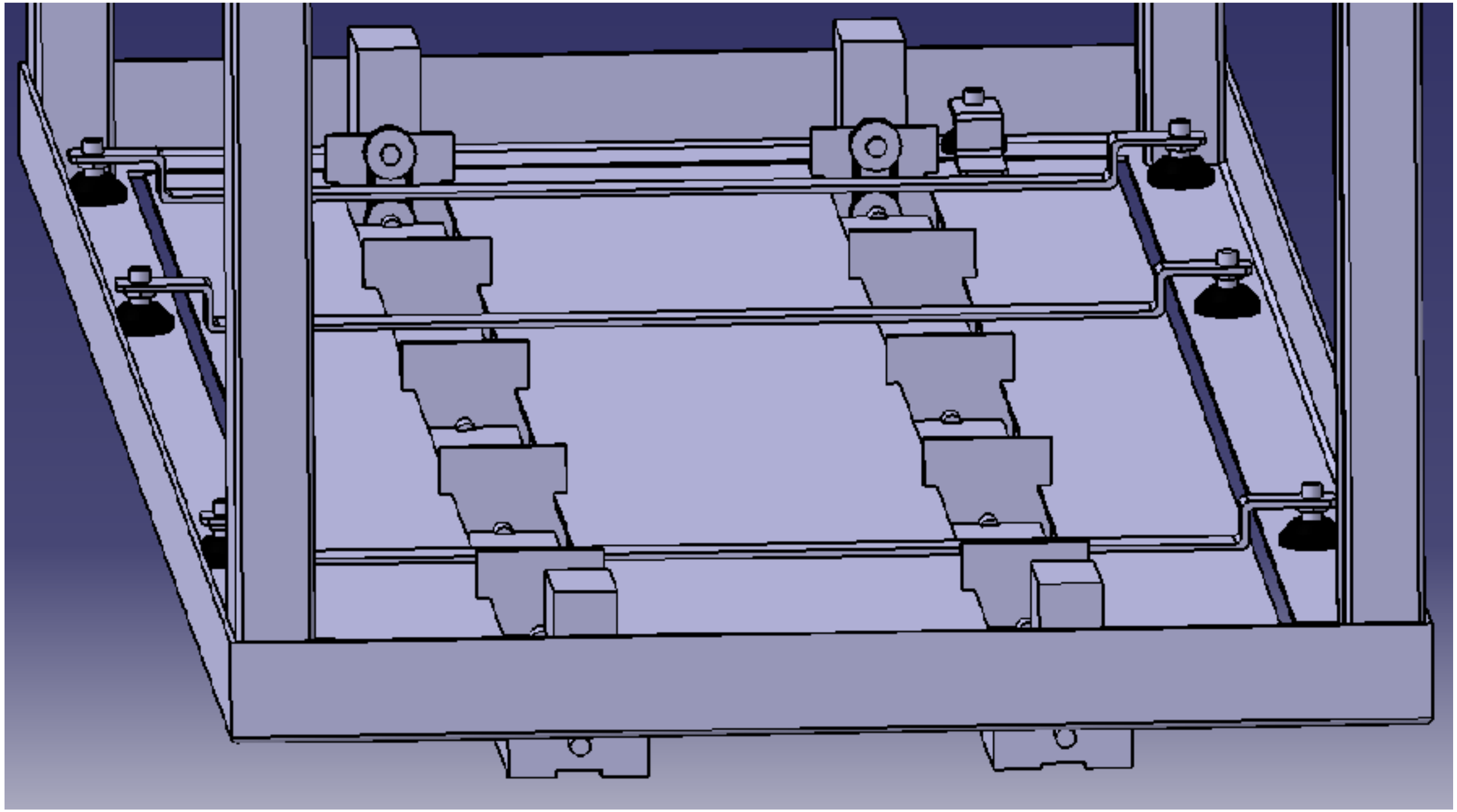


Section view A-A
Scale: 1:10

Estrutura

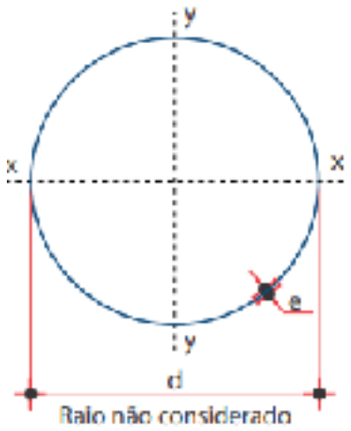
Estrutura

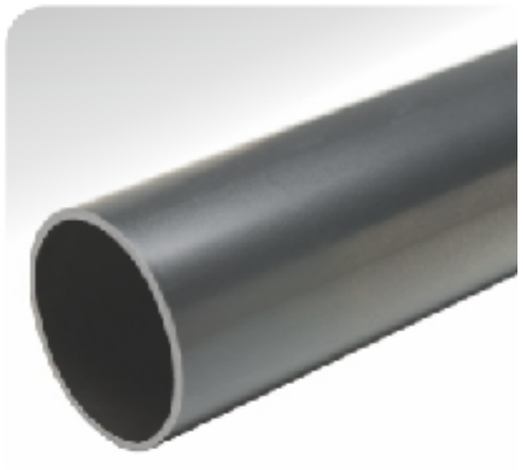
- Parte mais complexa da estrutura



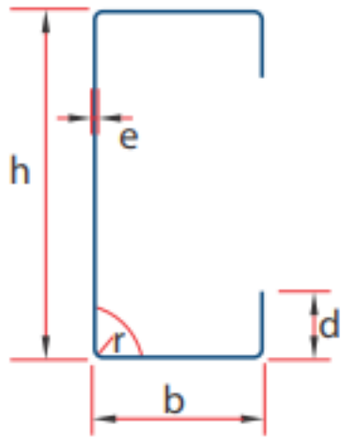
Estrutura

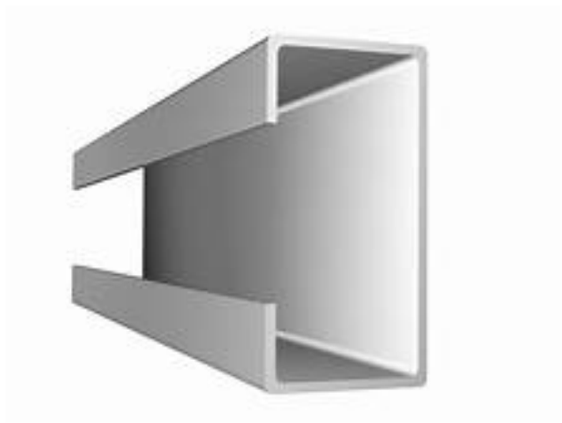
Estrutura





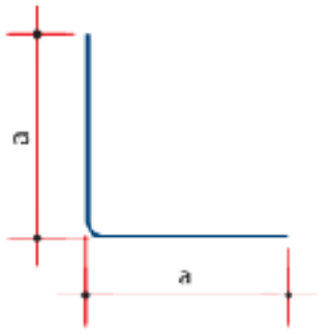
Perfil Aço Circular

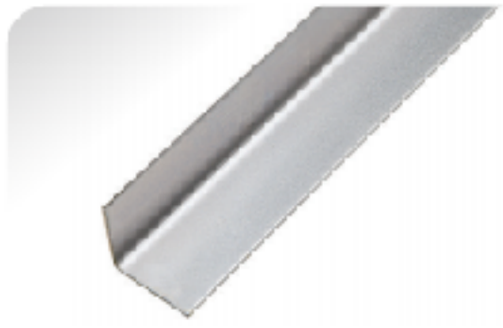




Perfil Aço C
2 tipos

Roda ferro 4 furos
Pneu 175/70 R13





Perfil Aço Cantoneira

Suspensão
Eixo de Torção 500 kg

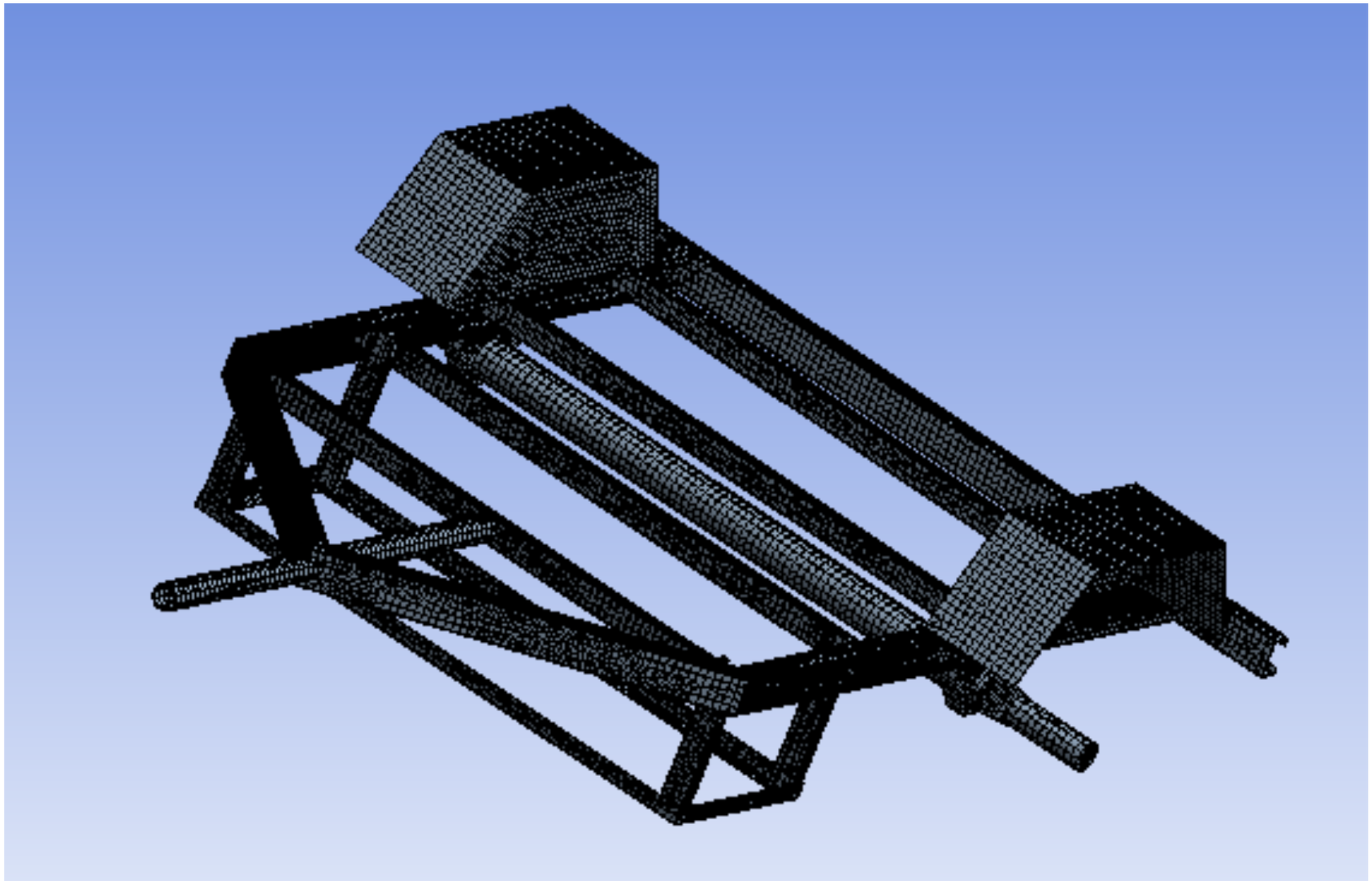
Estrutura

Estrutura

- Simulações - Malha estruturado

Nós: 44141

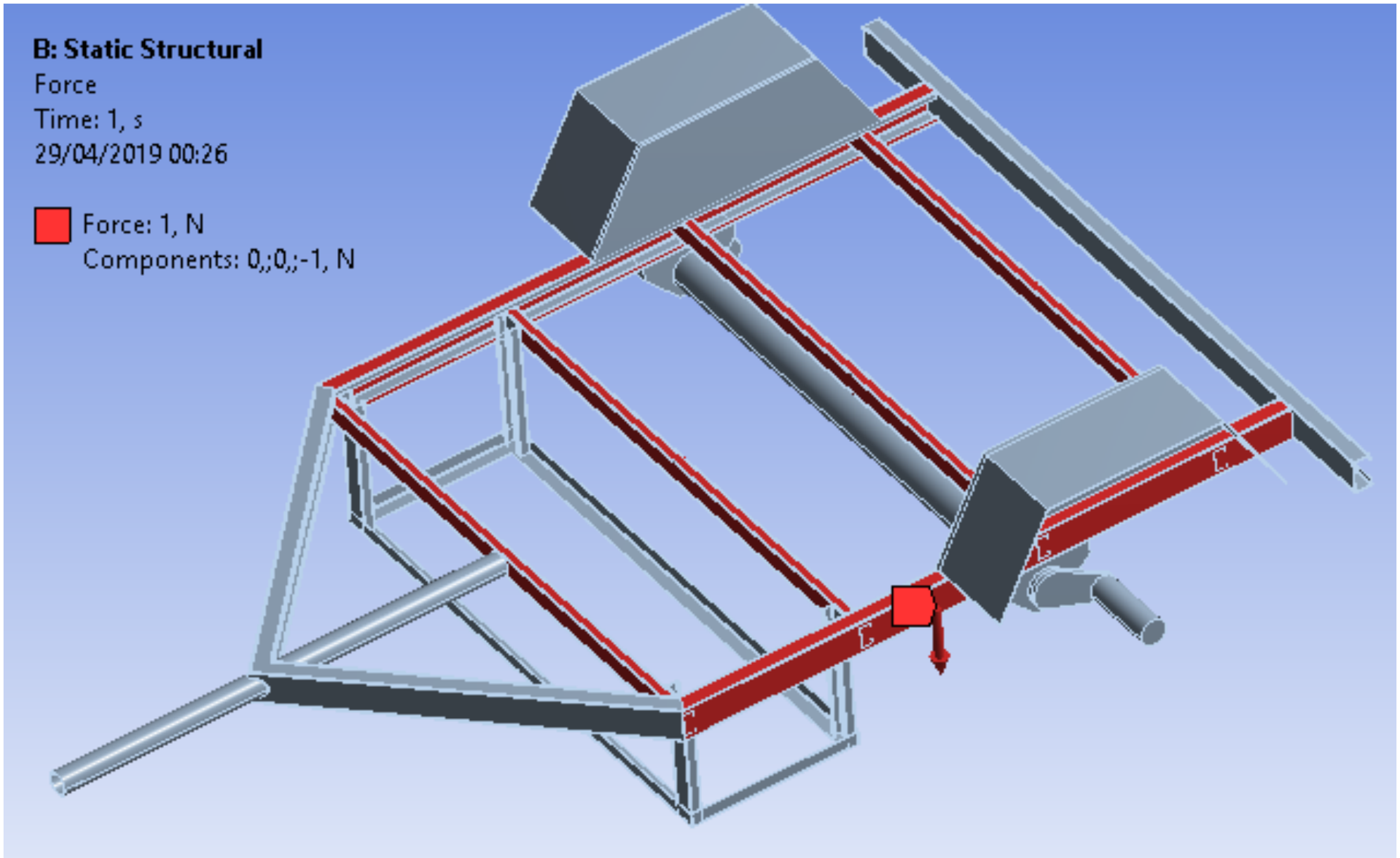
Elementos: 45221



Estrutura

Estrutura

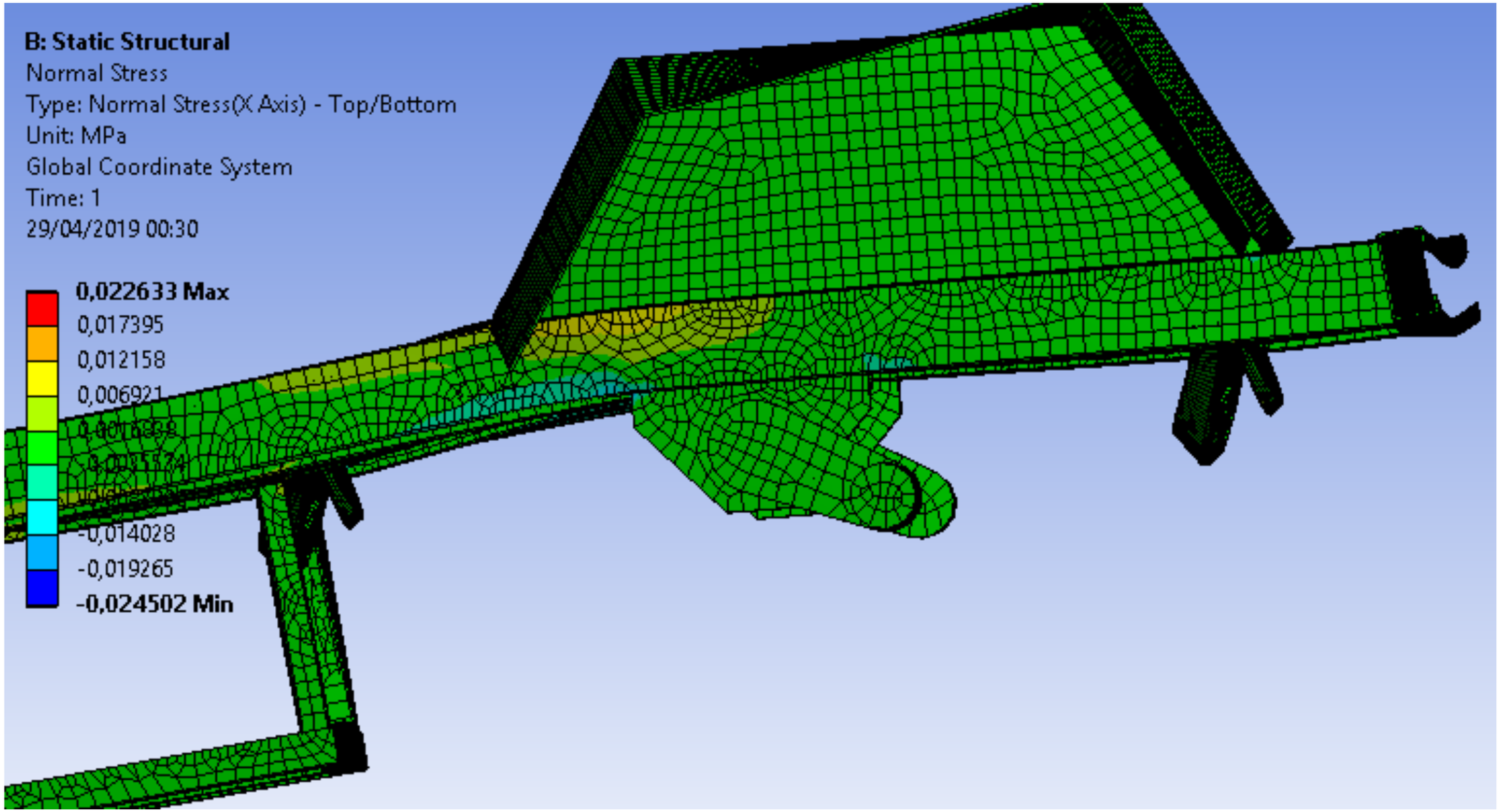
- Força distribuida aplicada



Estrutura

Estrutura

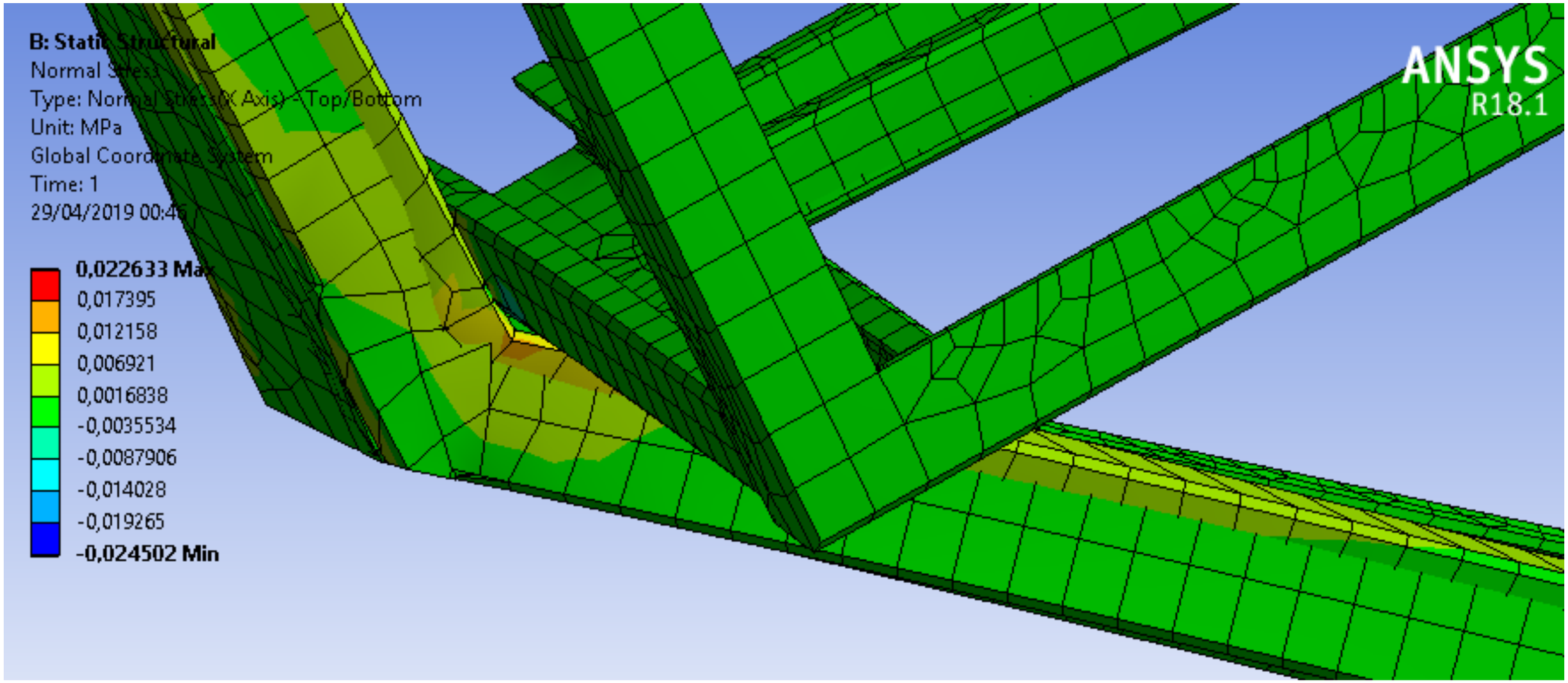
- Carregamento distribuído aplicado



Estrutura

Estrutura

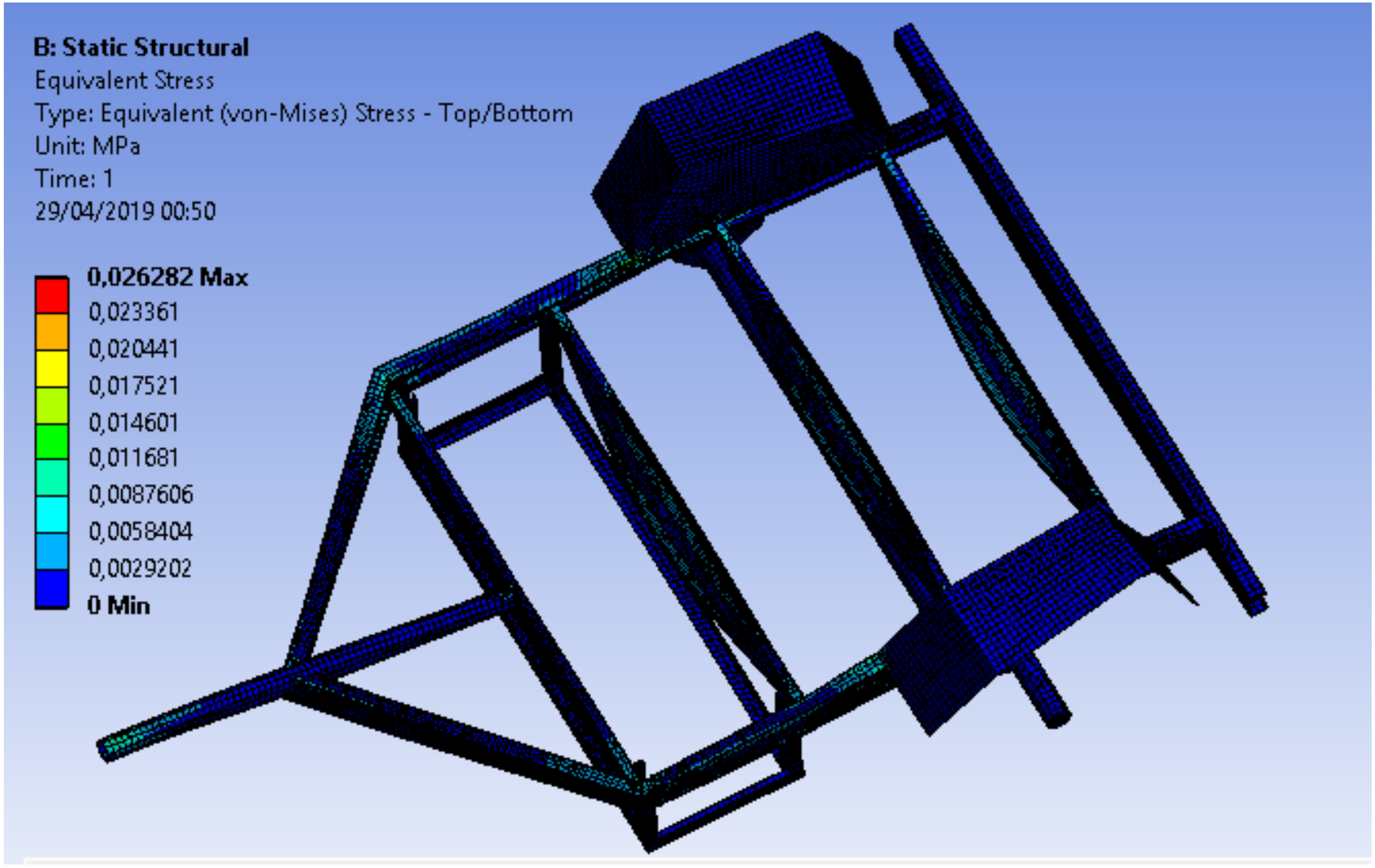
- Concentrador de tensão do cambão e o quadro



Estrutura

Estrutura

- Tensões equivalentes utilizando critério de Von Mises



Conclusão

- Software robusto, micro-serviço de fato;
- Problemas de medição resolvidos (Eletrônica);
- Estrutura robusta e complexa (Estrutura);
- Vai converter energia mecânica em elétrica (Energia).

Dúvidas?