

THE SMARTIRE SYSTEM

Air Pressure Monitoring and IOT system for vehicle wheels



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Add the “SMART” to the “TIRE”!

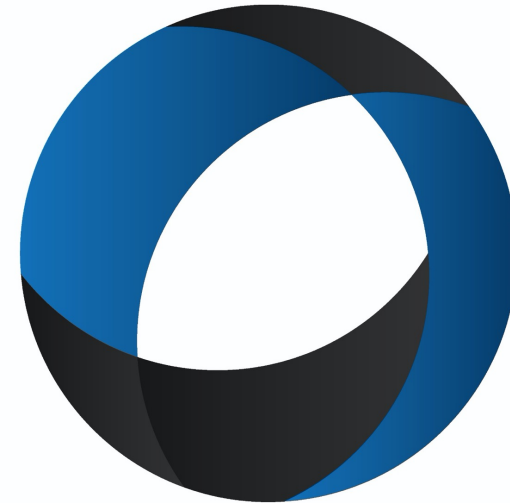
Stage

Seed + POC after experiments

Industry

Global Automotive & Tire Market

Big Data



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- Three times higher risk of a vehicle's accident
- 1 out of 9 vehicles accidents are due to defective tire
- Since 2014 vehicles must have tire air loss alerting device called TPMS -**However, alerting is not enough!**
- Only 44% of all truck tires are within 5 psi of their target inflation
- 90% of all tire failures are a result of tire under-inflation
- Almost half of all emergency roadside assistance calls are a result of tire failure
- 20% under-inflation reduces tire's life by 30%
- 20% under-inflation reduces fuel mileage by 2%

Pain

Loss of air is considered worldwide to be one of the major causes for car accidents

Trucks: A fleet of trucks requires many employment, inefficient management of air pressure.
Failure of maintain proper air pressure is a significant loss of money that can be saved by
using THE SMARTIRE SYSTEM

Pain

IDENTIFY → ALERT → AUTOMATICLY REFILL THE MISSING AIR

THE SMARTIRE SYSTEM can be integrated into new vehicle or as an after-market product, easy installation and does not impair wheel function.

THE SMARTIRE SYSTEM allow the user to adapt the right air pressure according to the road, for example:

- Decrease the air pressure in the tire while driving in an off-road
- Balancing the truck tire's air pressure- allows to reduce the tire's wear and fuel consumption, that caused by unequally distributed luggage on the truck

THE SMARTIRE SYSTEM SOLUTION

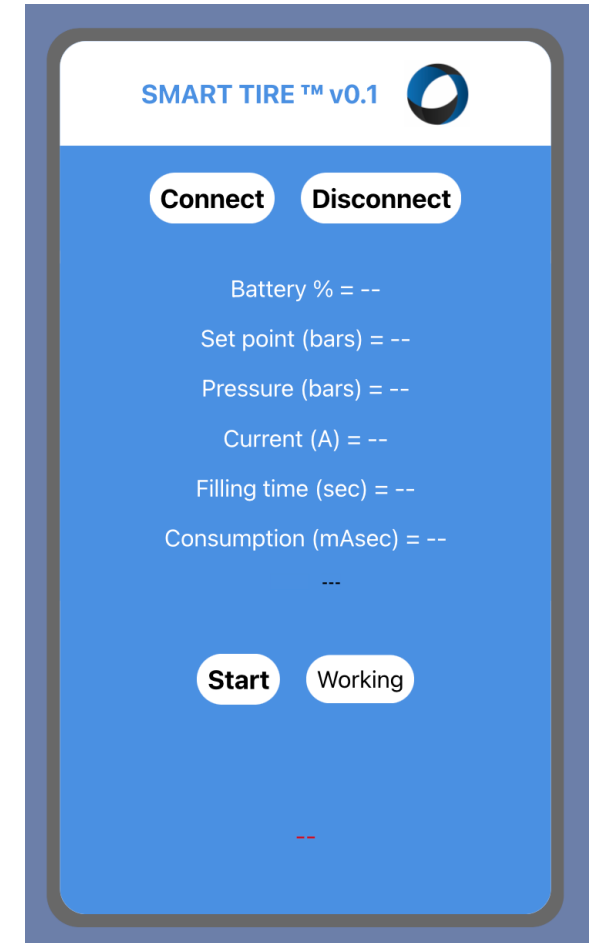
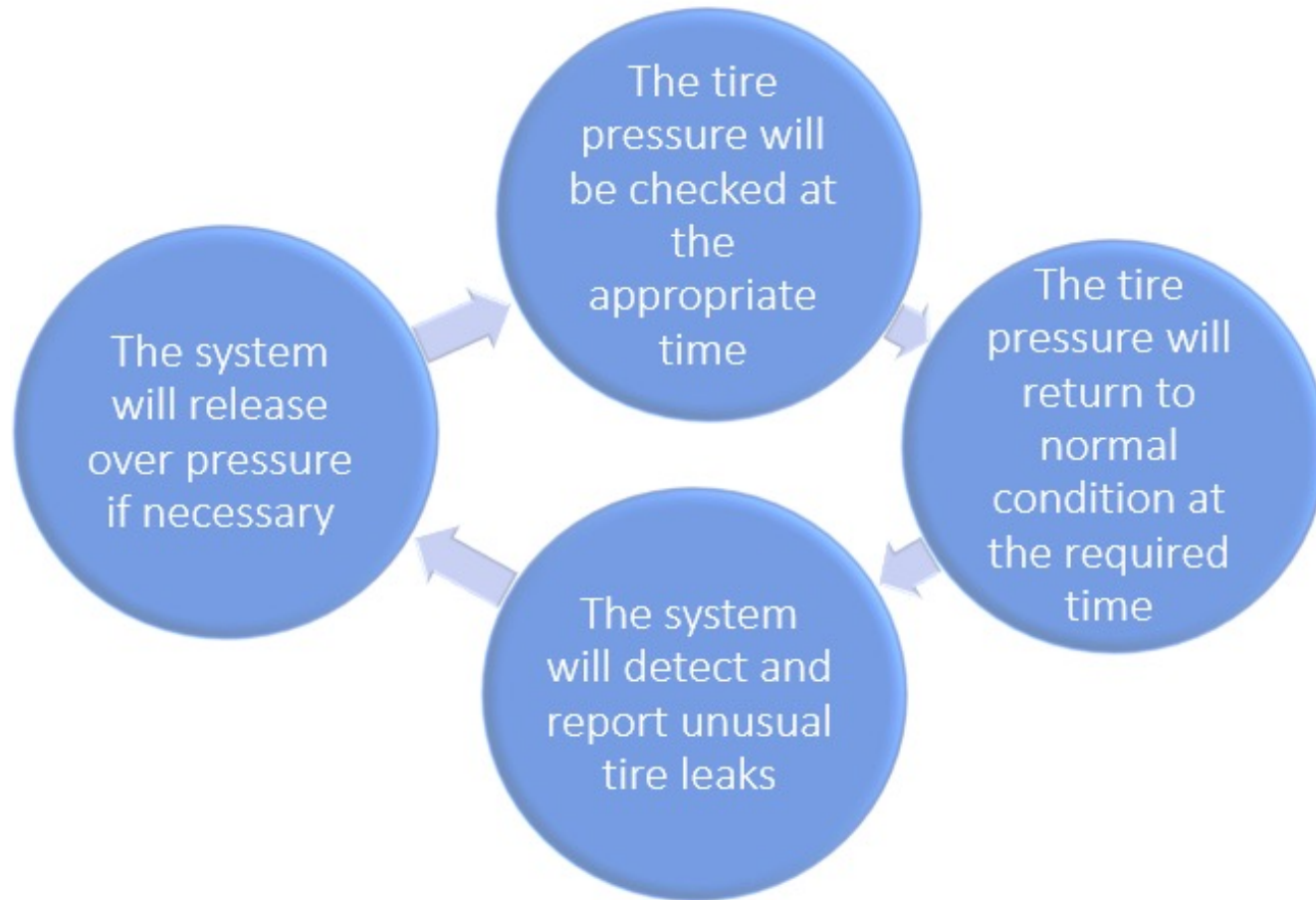
- **AUTOMATICLY REFILLS** the tire's air pressure when needed in real time
- Ability to adjust the pressure according to driving condition
- Reduces wear
- Saves Fuel
- Provides constant feedback through the application
- Fixes flat tires/punctures - In the future
- Alert for tire imbalances- In the future
- Big Data: collects data of driver's behavior, recommendations for tire replacement, fitting suitable tire to driver, collection of information of road characteristics and road damage

THE SMARTIRE SYSTEM SOLUTION

We will design 3 series of systems dedicated for:

1. Passenger car
2. SUV
3. TRUCKS

THE SMARTIRE SYSTEM SOLUTION



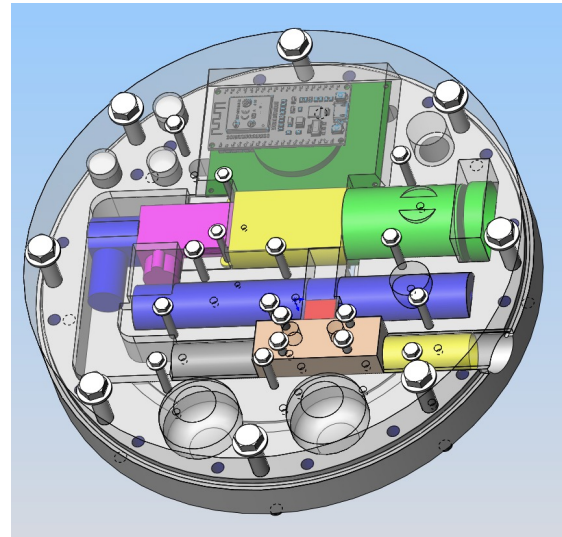
THE SMARTIRE SYSTEM combines advanced technological solutions in the field of pneumatics (regulation and sealing) and electronic monitoring and control solutions.

The smart tire system has no competitors in the market

	Market share	Air pressure loss notification	Automatic Refilling	Low cost	Fuel Saving	Feedback through application	Direction to closest tire repair shop	Adjust pressure according to condition	Alert for tire imbalance	Fixes flat tires/punctures
Be Inspired SMARTIRE		V	V	V	V	V	V	V	V	V
Goodyear 360	Futuristic tire that has a special molding which is a combination of a rim and 3D printing. Not expected to be available for the next 20 years.									
Tesla Smart Tire	Not marketing so far	V	X	X	X		V	X	X	X
Run flat tire	1%	X	X	X	X	X	X	X	X	V
TPMS	70%	V	X	V	X	X	X	X	X	X
Vision Michelin	The tire requires a massive change in the vehicle's composition. This technology is not applicable and will not be in the coming decades. Not expected to be available for the next 20 years.									

Development tests

1. Mechanical integration
2. Electrical integration
3. Balancing control (w/o air pipe)
4. I/O tests “on table”
5. Dynamic tests on a CNC milling machine
6. Control overview after the dynamic tests
7. I/O tests “on table”
8. Functional tests “on table” with a dummy tire
9. Functional tests with a car



Experiments results

1. Effectiveness of THE SMARTIRE SYSTEM

We creating an autonomous system that detecting a drop of air pressure and filling the missing air automatically and effectively.

2. Installation of THE SMARTIRE SYSTEM on the tire

We found that the system can be installed on the car wheel in a simple way

3. Installing & balancing

We tested on the CNC milling machine. The system did not affect the tire's balancing and it complies with the standards for safe driving.

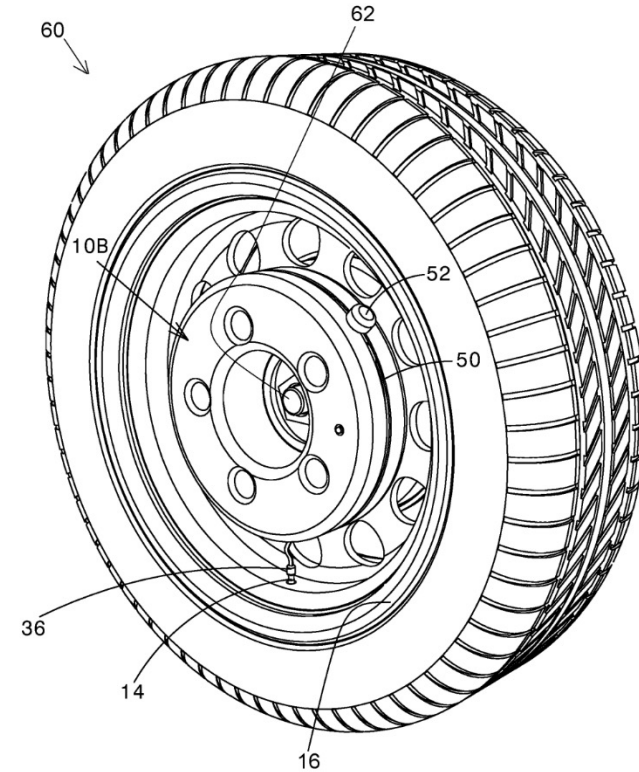
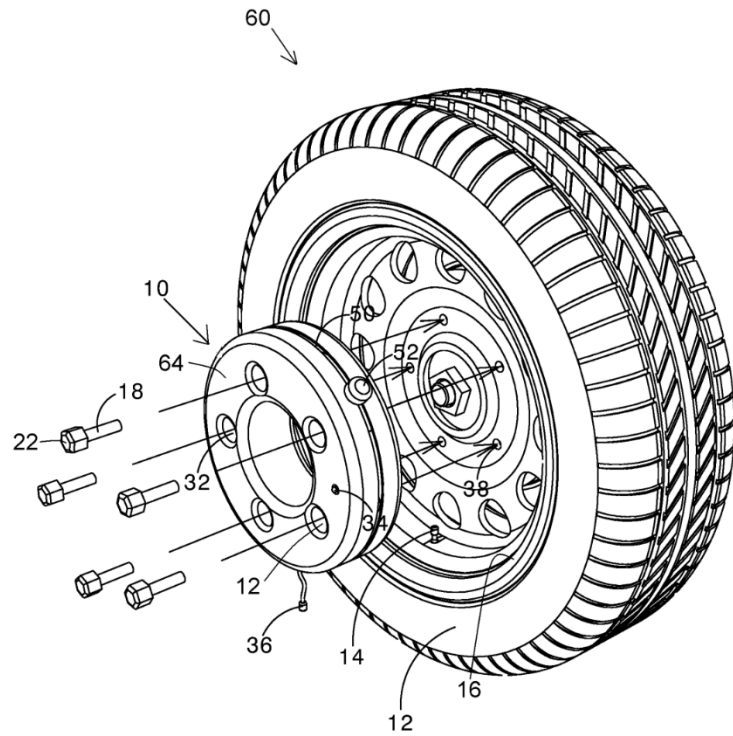
4. The components efficient and completeness

The system components were not damaged after stage 1-3, thus the system is resistant to vibrations and temperature changes.

5. Air leaks

There were no significant leak from the system

THE SMARTIRE SYSTEM installation



THE
SMARTIRE
SYSTEM
future
design



Registered patent:

- USA since 2020
- ISRAEL since 2015

Proof of concept: 3 proof of concept has already been developed

IP AND PRODUCT STATUS

THE SMARTIRE SYSTEM is easily installed in almost EVERY vehicle. Thus, the potential worldwide market is almost endless: 2,000,000,000 vehicles "on the road" plus 80,000,000 additional new vehicles every year

THE POTENTIAL MARKET

According to our market research, **58% of women, and 48% of men** are willing to purchase THE SMARTIRE SYSTEM, at sale price of \$ 225

THE SMARTIRE SYSTEM market research

1. Women
2. Autonomous vehicles-Taxi & Bus
3. Transportation corporations-Trucks

Target audience

The business opportunity

According to our research and study, the annual cost caused by lack of tire pressure is significant

- For the TRUCKS we will save 500\$-2,300\$ annual expense for every truck per year!
By saving fuel expenses, employee wages, tire wear and reducing the risk of a road accident
- For PRIVATE VEHICLES we will save 100\$-230\$ annual expense for every vehicles per year!
By saving fuel expenses, tire wear and reducing the risk of a road accident

THE SMARTIRE SYSTEM has two main sources of income in the short term, and one source of income in the long term

1. Revenue from sales for trucks, SUVs and passenger cars
2. income from monthly application services
3. Sale of data and information on information collected in Big Data (collection of data on driver behavior, recommendations for tire replacement, adjustment of a suitable tire according to the nature of the driver, collection of information on road signs and road damage)

B2B: Based on direct sales to car & tire industries & heavy transportation

B2B2C: Distribution to the client through stores & internet

BIG DATA: In the future, we will be able to sell the driver behavior and tire condition by processing big data.

Our revenue model

Financial projections

	<u>Year 0</u>	<u>Year 1</u>	<u>Year 3</u>	<u>Year 6</u>
INCOME(\$)		16,604,213	52,261,106	74,953,504
Total customers		34,828	247,406	654,132
PRODUCTION COST (\$)		(12,345,974)	(39,317,060)	(56,171,453)
PROFIT AFTERTAX	-\$1,207,500	\$2,320,904	\$6,053,766	\$8,832,544

		<u>Year 1</u>	<u>Year 3</u>	<u>Year 6</u>
New customers		34,828	143,291	204,849
Customers who have left	-15%		-18,373	-79,285
Total customers		34,828	247,406	654,132

Regulation

“Regulation 380 (a) of the Traffic Regulations”

In the past, we contacted the "GLOBAL PRODUCT CERTIFICATION SOLUTIONS" company, which tested the relevant standards in Europe and emphasized the "COMMISSION DIRECTIVE 2004/104 / EC" standard”

Regulation-Conclusion

A declaration of conformity must be issued in accordance with the procedures of “**Directive 89/336 / EEC or 1999/5 / EC**”.

The summary of the test and the standards led to the fact that the product **does not need the E-MARK** marking in order to enter the European market.

It can be tested according to ITE standards.

We will need to declare DOC in order to bring the product into the European market and mark it with CE.

We will start the tests above in laboratories in Europe after we finish the final prototype after experiments.

Founder & Team

MR Yonatan Ariel Shemesh, FOUNDER & CEO

Entrepreneur of THE SMARTIRE SYSTEM

B.A in accounting & LL. B in law

MR Shlomo Shemesh, CFO

C.P.A with 40 years of experience

Senior Partner in ERNST & YOUNG

Franck Thelot

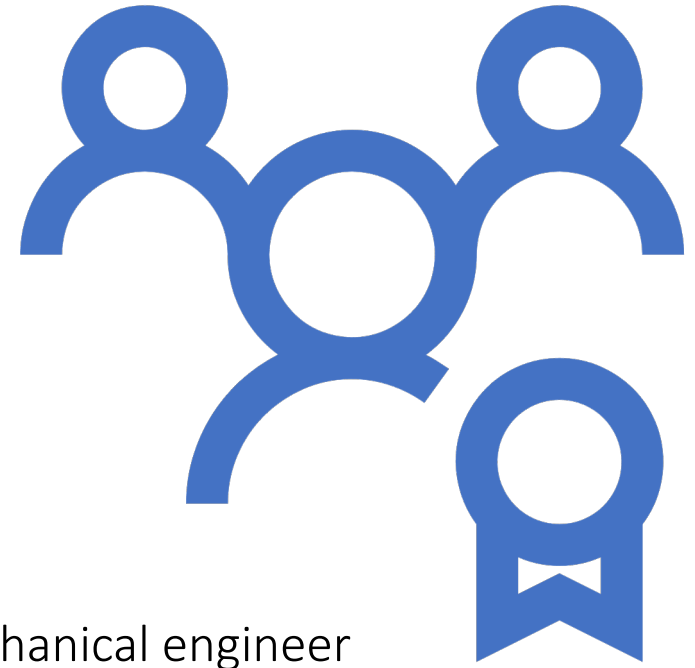
CERTIA'S CEO

20 years as a mechanical engineer

Patrick Touitou

CEPRE'S former CEO

40 years as an electronics engineer



Funds need

1.2 million dollars

Use of funds

First year:	Prototype development
	Experiments
	Statements certificate
	Product insurance
Second year:	Producing & selling

Investment opportunity

We can save lives, prevent accidents and save a lot of money

WHO SAID THAT YOU CAN'T REINVENT THE WHEEL

Thank You

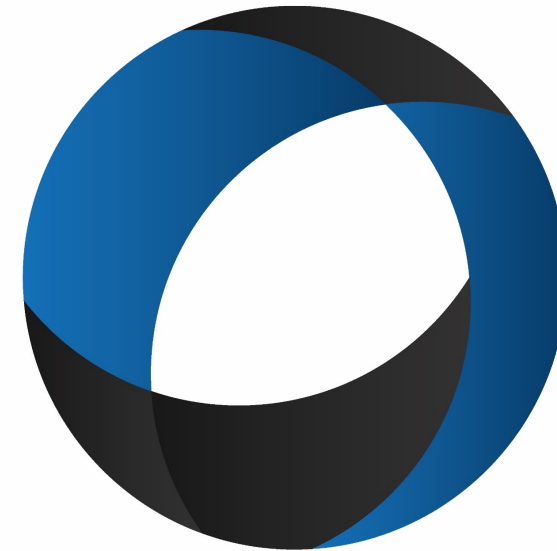
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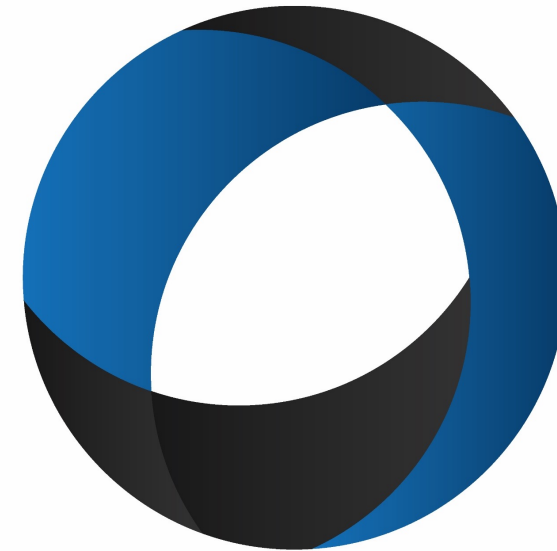
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We can save lives, prevent accidents and save a lot of money

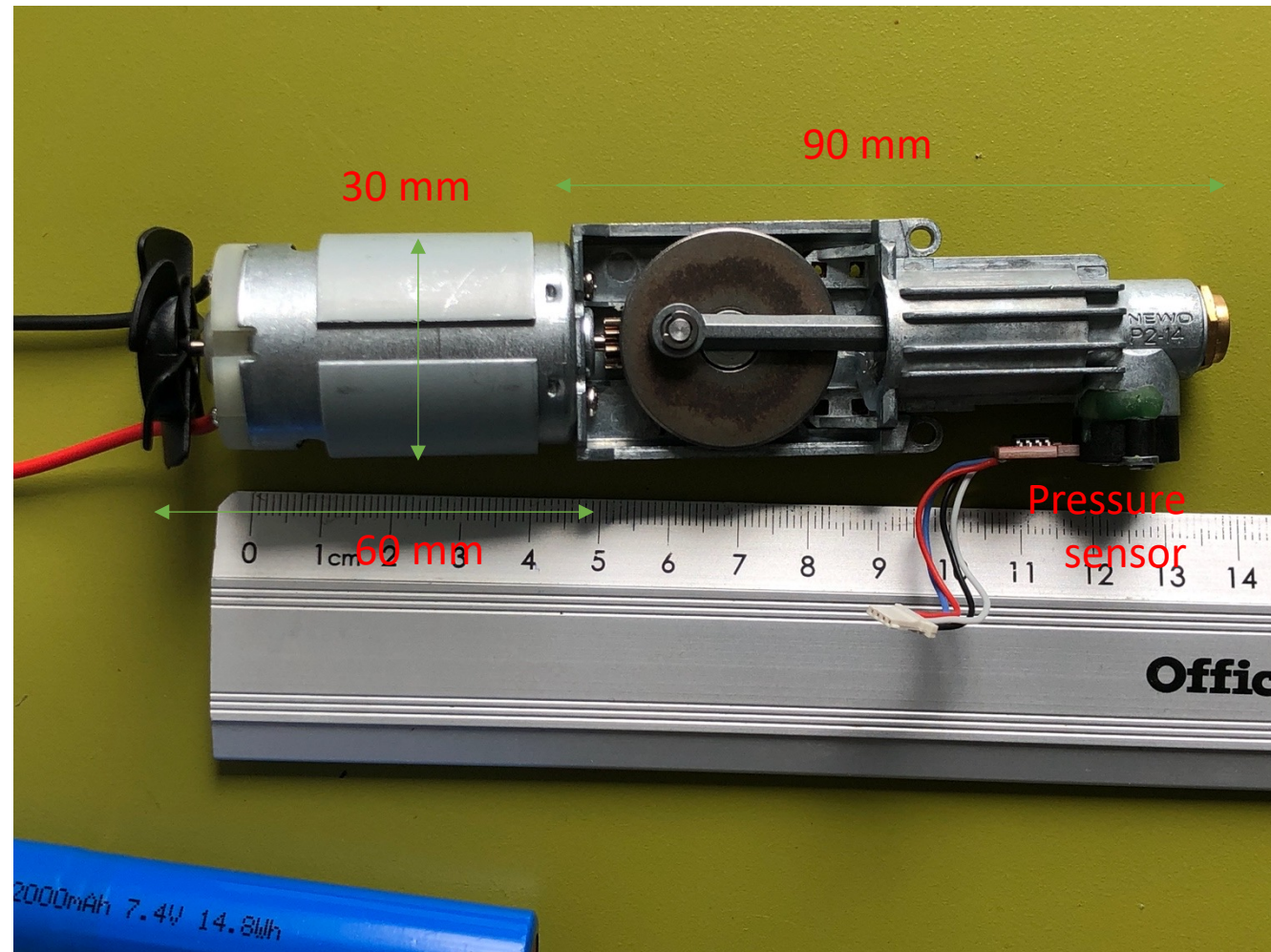
**WHO SAID THAT YOU CAN'T
REINVENT THE WHEEL**

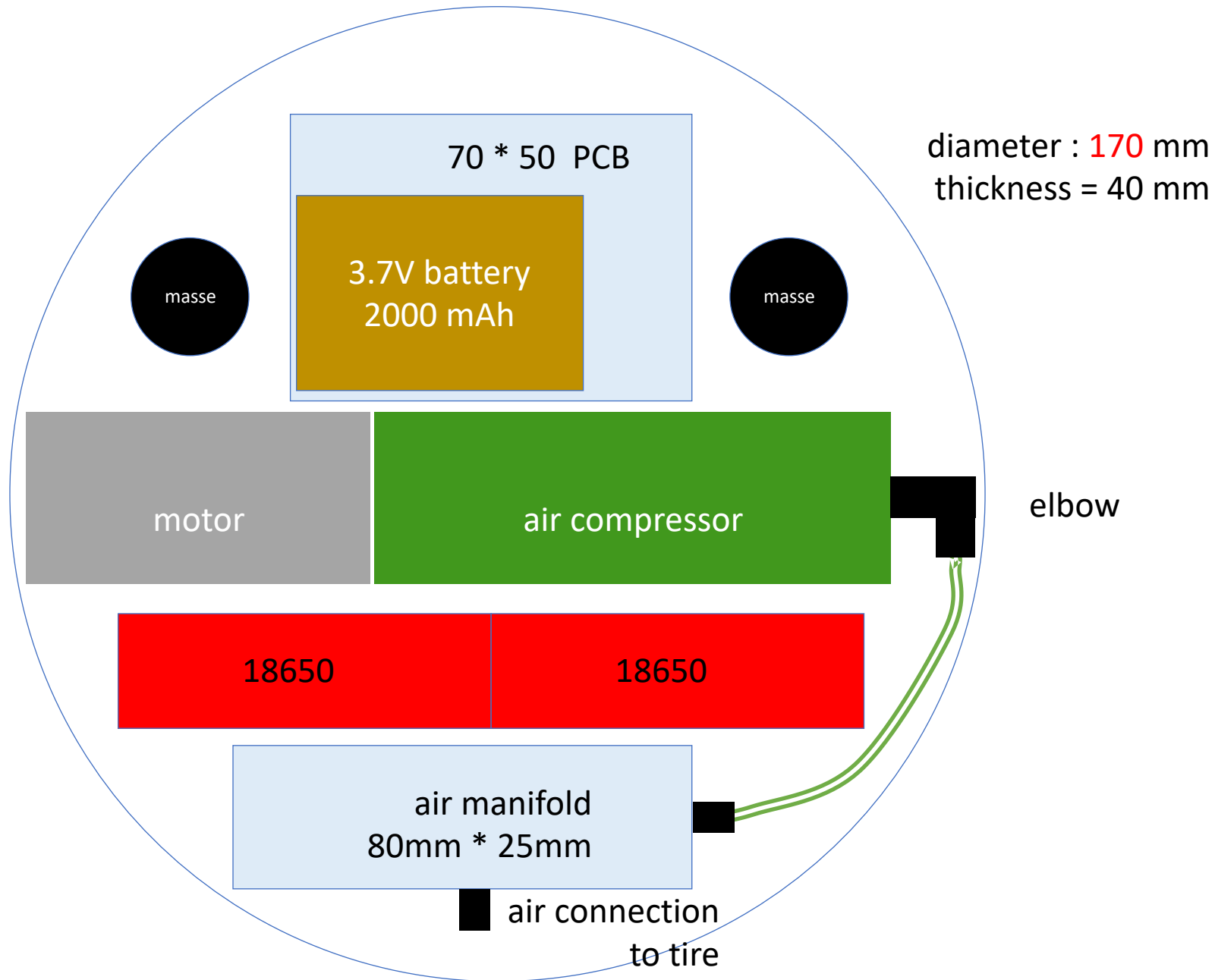


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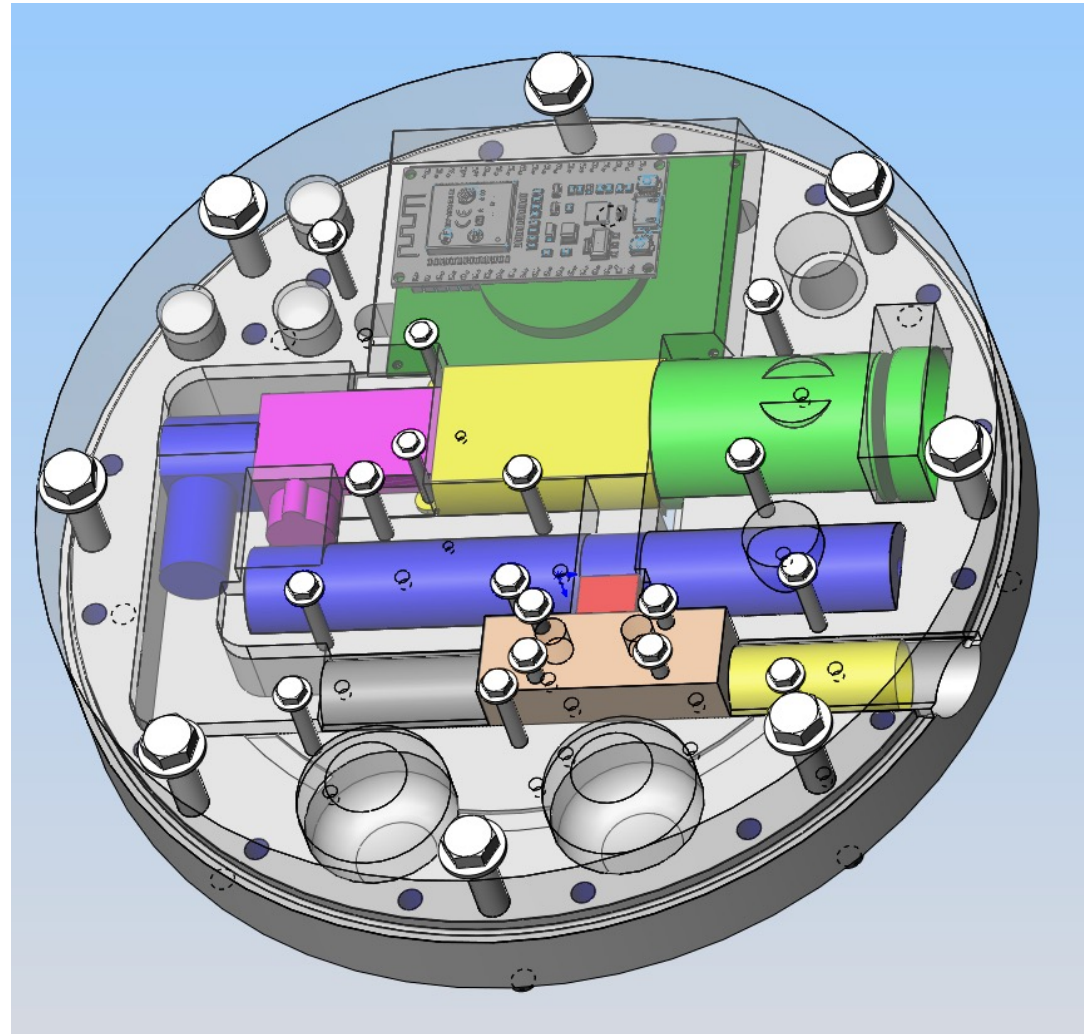
Actual design

Actual design





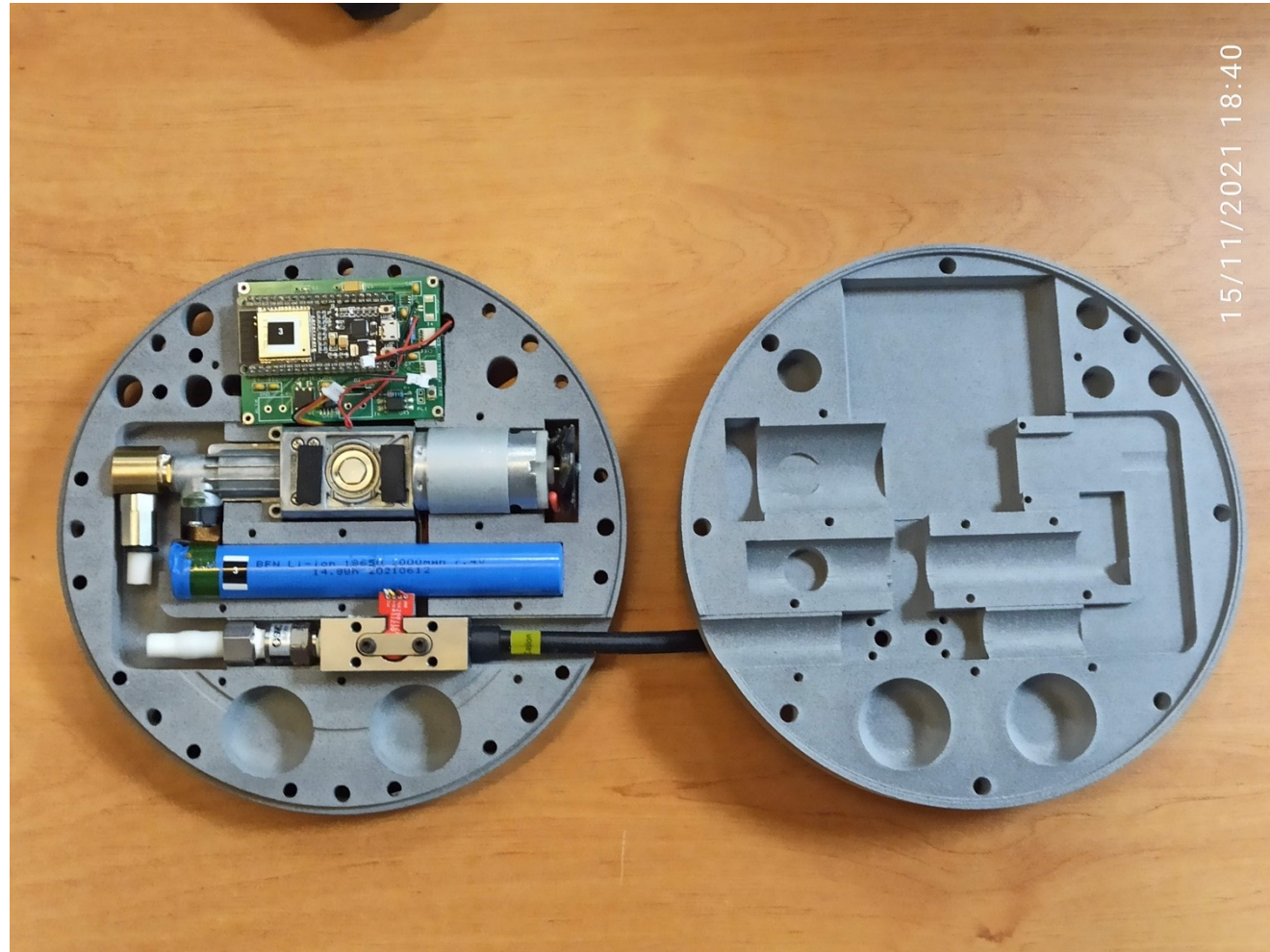
Case



Wheel mounting



Case 3D printing



Wheel mounting




development tests

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8. functional tests “on table” with a dummy tire
9. long term leaks tests
10. functional tests with a car

R & D process results



1. Development of a dedicated POC for the vehicle
 2. Installing the POC on the vehicle wheel
 3. Experiments under laboratory conditions, installation of the POC on the vehicle and driving at a speed of 100 km / h
- 

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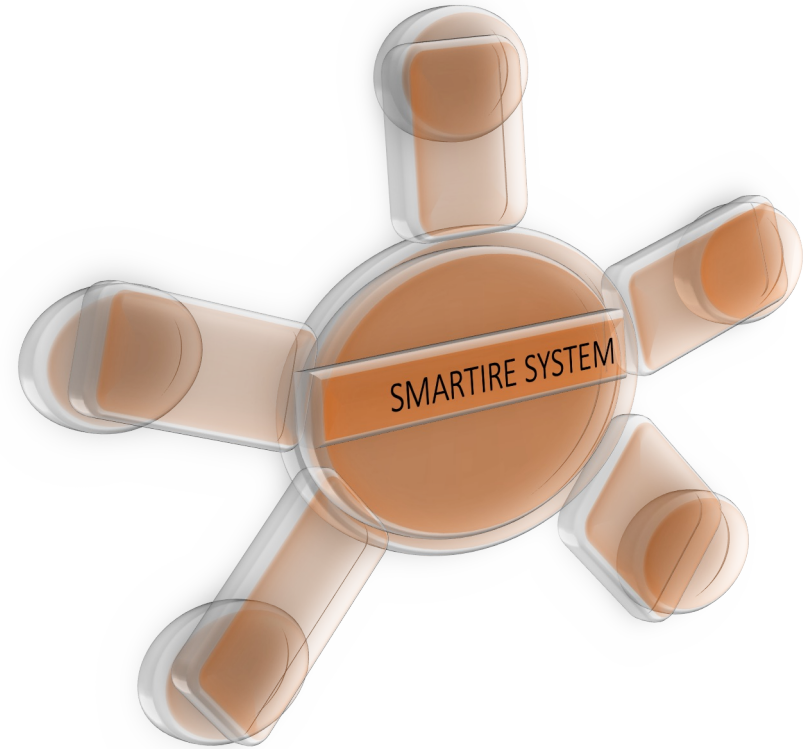
There were no significant leaks from the system.

Experiments results



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Future design

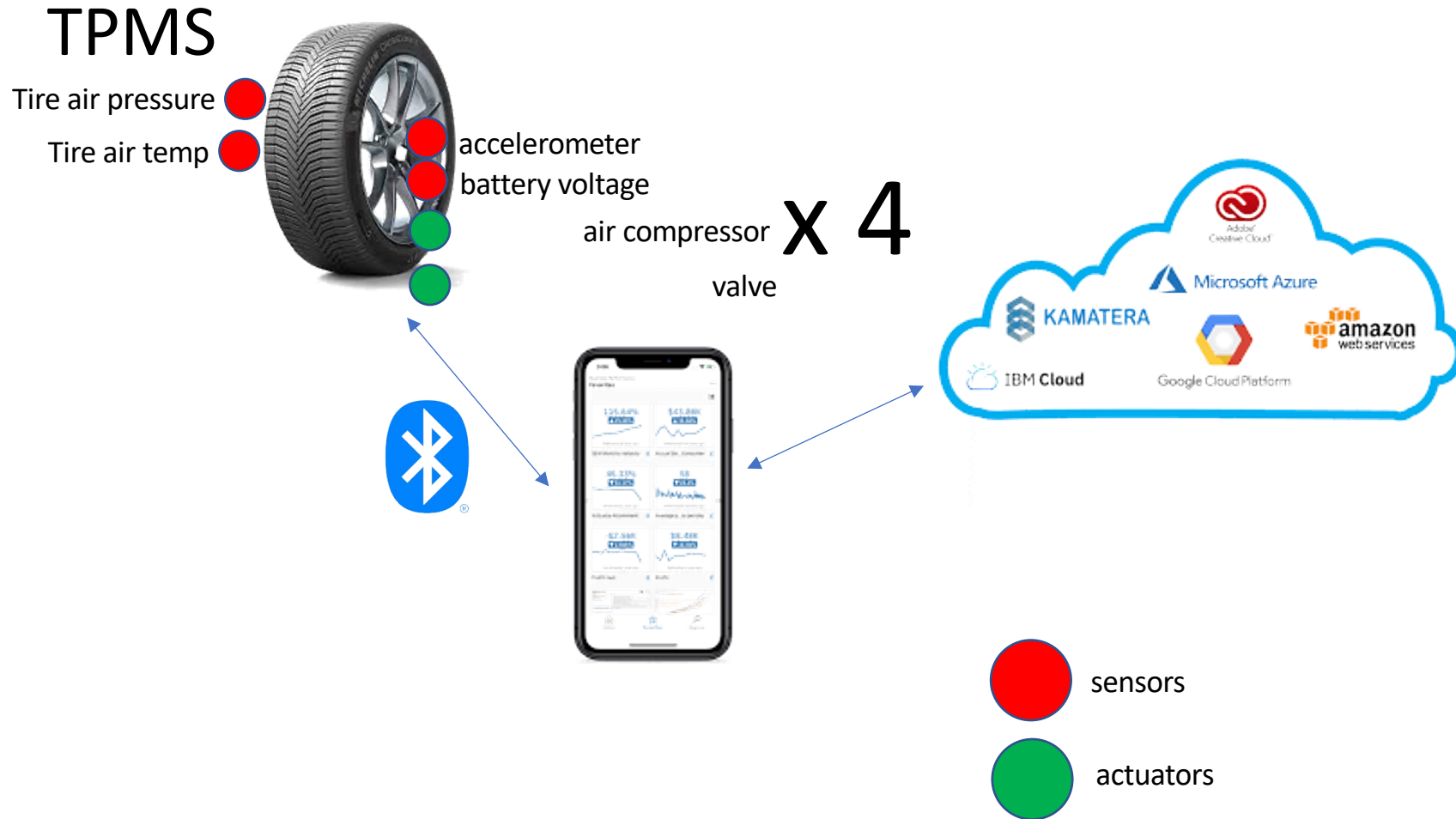




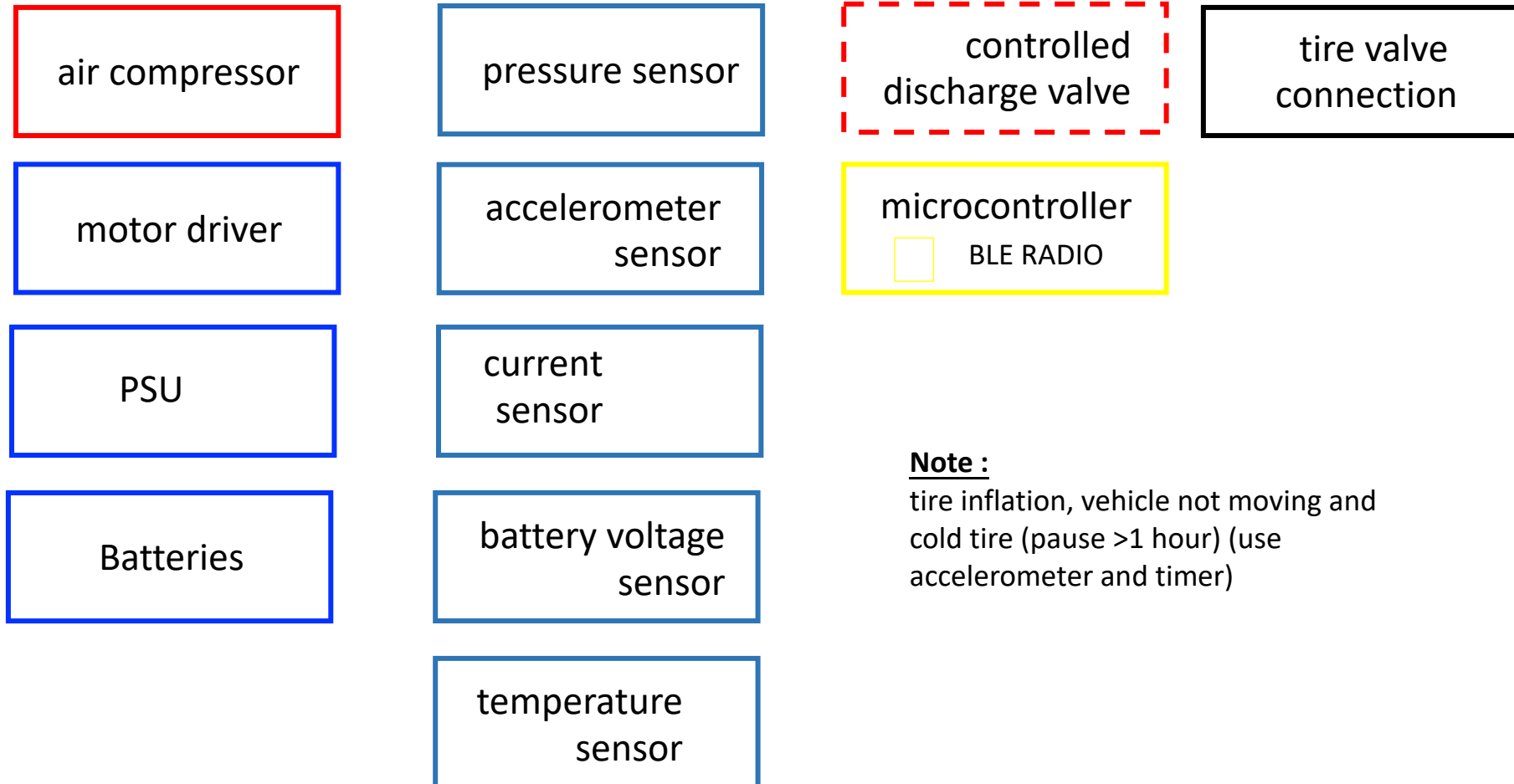
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System architecture

System architecture



Smart compressor system



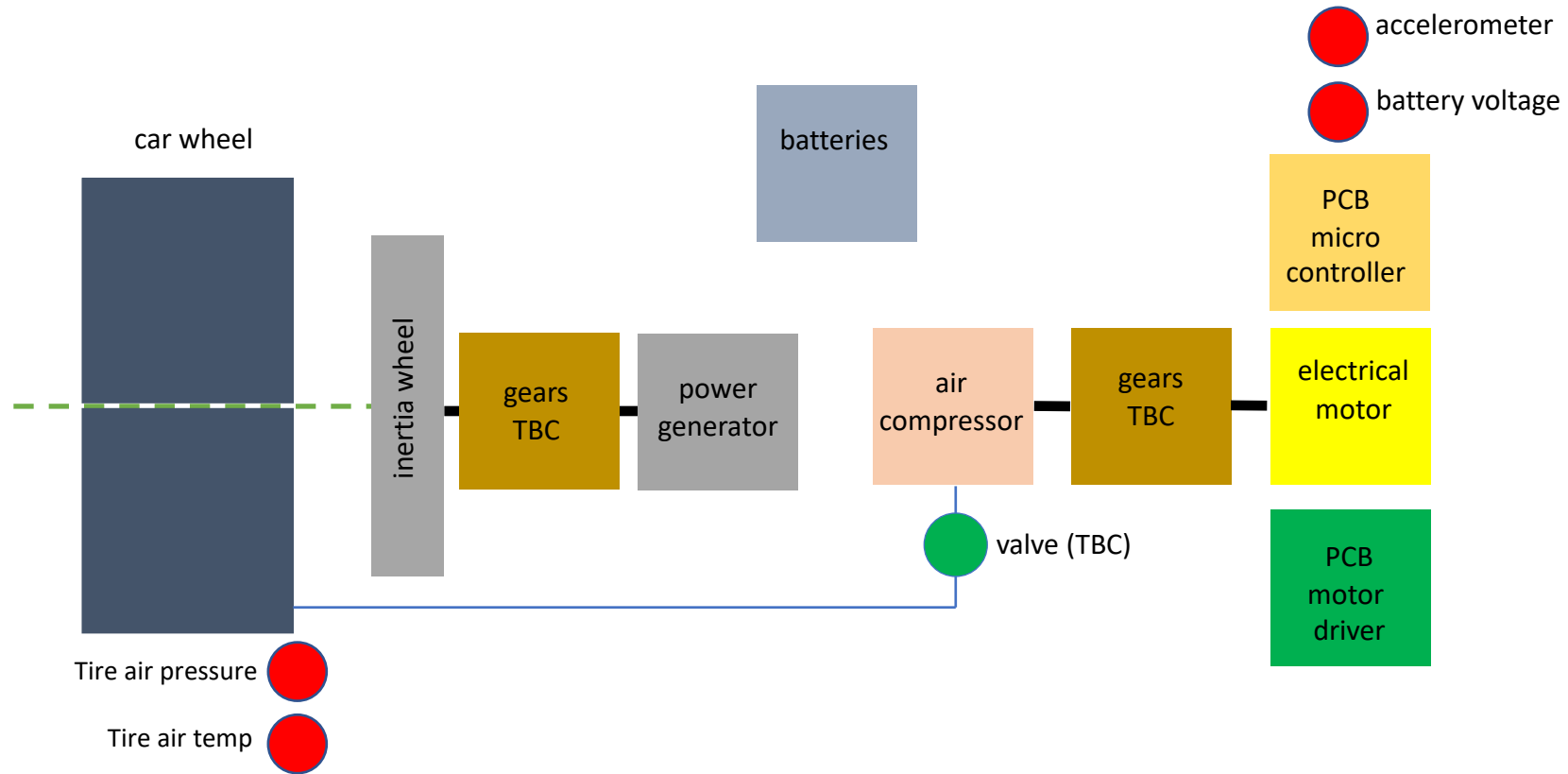
Note :
tire inflation, vehicle not moving and cold tire (pause >1 hour) (use accelerometer and timer)



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Hardware architecture

Hardware architecture



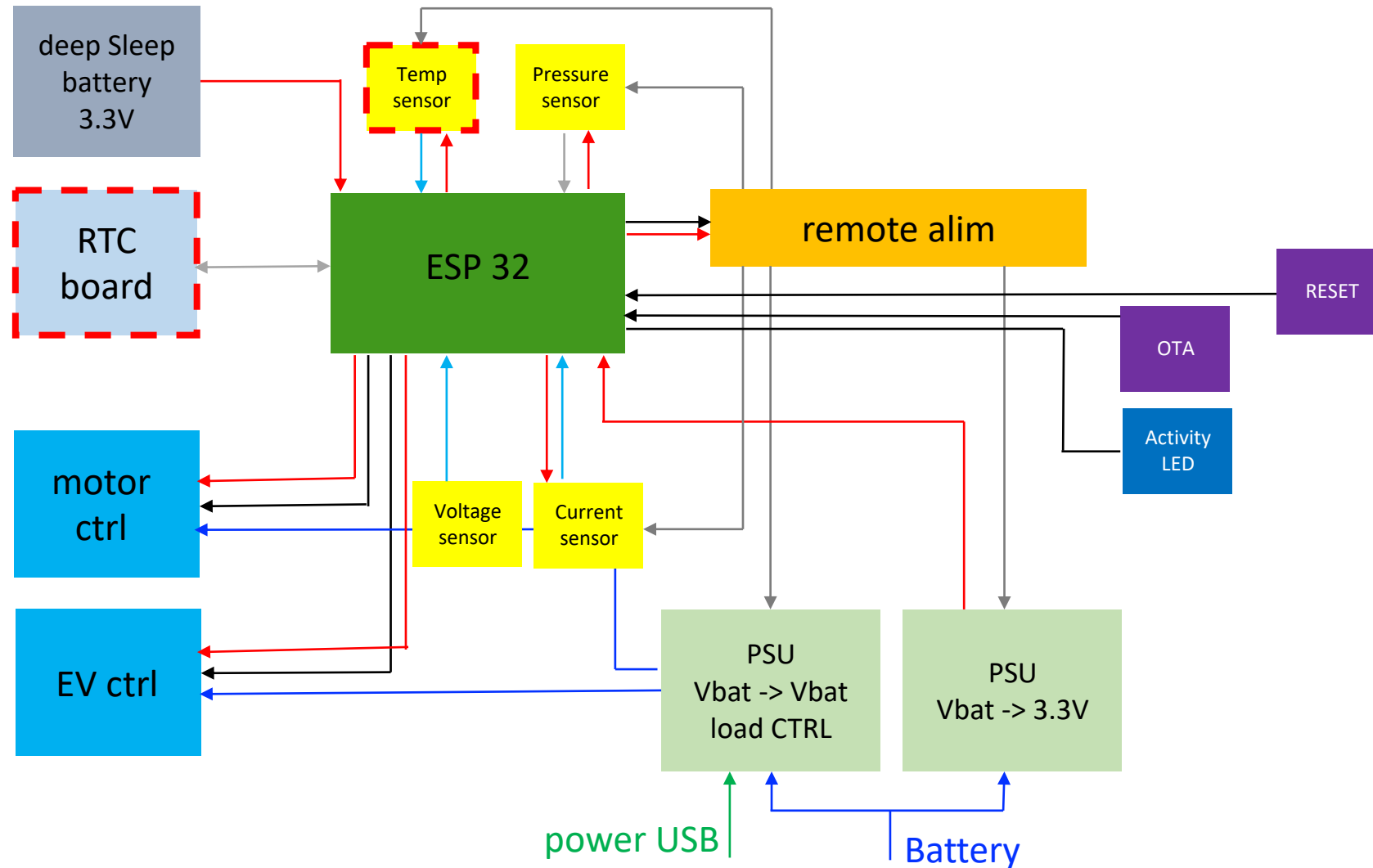
4 sensors
2 actuators



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PCB architecture

PCB architecture





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BOM

SMART TIRE				
	POC	Prototype	Pre - Serial	Comments
AIR COMPRESSOR + MOTOR	40.00 €	40.00 €	10.00 €	sourcing
PRESSURE SENSOR		0.00 €	3.00 €	sensor + PCB
TEMP SENSOR (DS18B20)		2.00 €	2.00 €	to be changed by MPU 6050 ?
VOLTAGE SENSOR		0.00 €	0.00 €	PCB included
CURRENT SENSOR		0.00 €	0.00 €	PCB included
PCB equiped		10.00 €	5.00 €	
ESP32	7.33 €	3.00 €	3.00 €	
BATTERIES (4 * 18650)		16.00 €	6.00 €	
AIR MANIFOLD	385.00 €	50.00 €	10.00 €	IF 3D printed TBC
ANTI RETURN VALVE	8.58 €	9.00 €	3.00 €	
RELEASE VALVE		20.00 €	5.00 €	
PNEUMATICS COUPLINGS AND TUBES		20.00 €	3.00 €	
FILLING TUBE	10.00 €	10.00 €	3.00 €	included in the air compressor
CASE	393.00 €	50.00 €	30.00 €	IF using our own 3D printer
VARIOUS PARTS		50.00 €	5.00 €	
MECHANICAL INTERFACE		50.00 €	10.00 €	TBC
WHEEL SCREWS		50.00 €	5.00 €	TBC
TOTAL		380.00 €	103.00 €	
TOTAL 4 units		1 520.00 €	412.00 €	
CONTROL BOX				
		Prototype	Serial	Comments
PIO WH		30.00 €	25.00 €	
TOUCH SCREEN 3.5'		13.00 €	10.00 €	
MMU : MPU 6050		1.10 €	1.00 €	
CASE		30.00 €	5.00 €	
VARIOUS PARTS		20.00 €	5.00 €	
SIM808 Module GSM GPRS GPS		20.00 €	0.00 €	Optionnal without the SIM !
TOTAL		114.10 €	46.00 €	
OTHER				
		Prototype	Serial	Comments
USB C CHARGER 45W		20.00 €	15.00 €	
USB C CAR CHARGER		3.00 €	2.00 €	
USB C CABLE		3.00 €	2.00 €	
TOTAL		26.00 €	19.00 €	
TOTAL PACK		1 660.10 €	477.00 €	



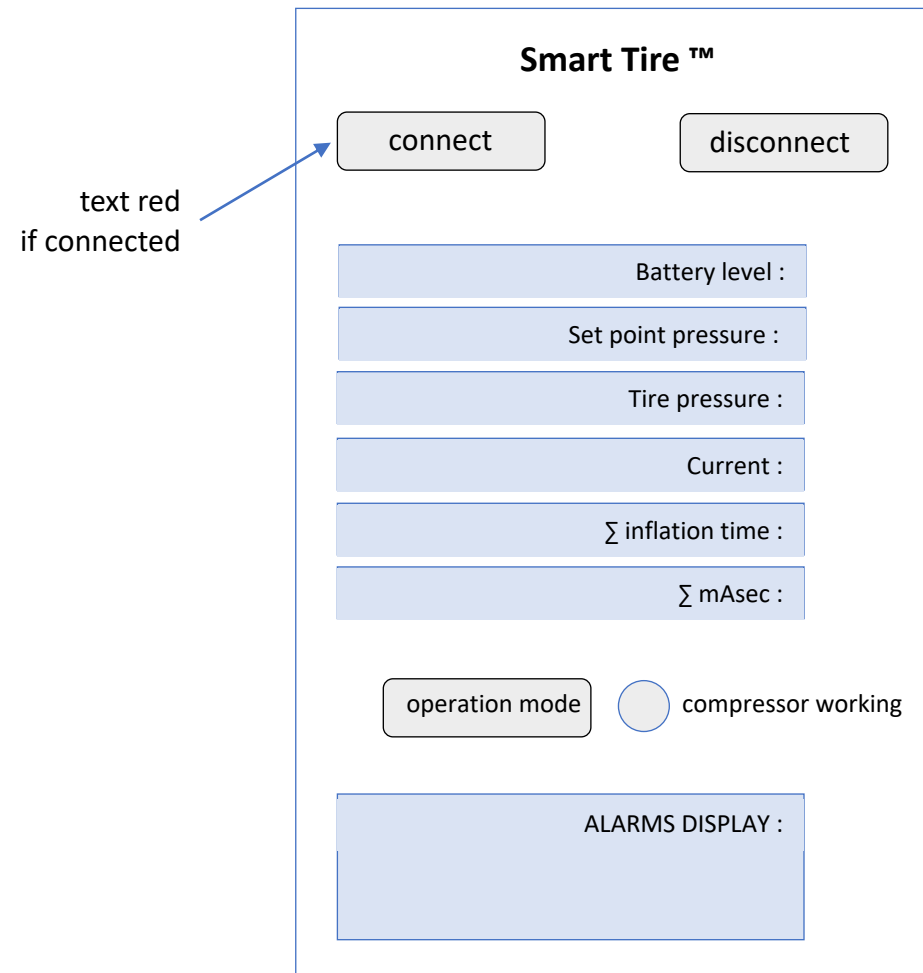
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Application

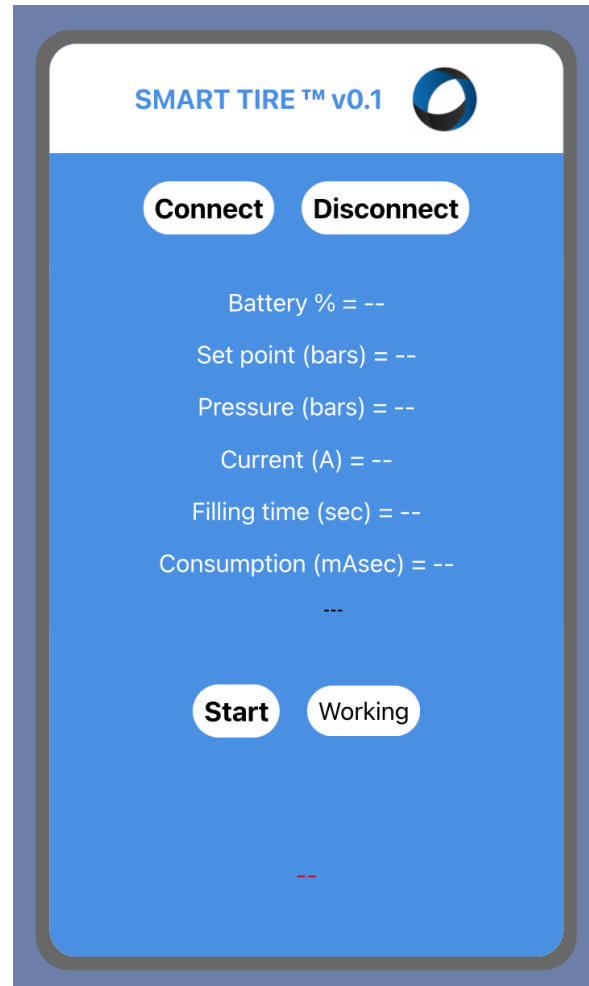
Companion application

- display : set point pressure
- display : pressure, battery voltage, cumulated inflation time, cumulated mAsec, alarms display
- display : operation mode / compressor working, choice of operation mode
- BLE connection
- Cross dev platform (IOS/Android/Web) :
thunkable.com

POC 1 – companion application



POC 1 – companion application



Companion application future developments

