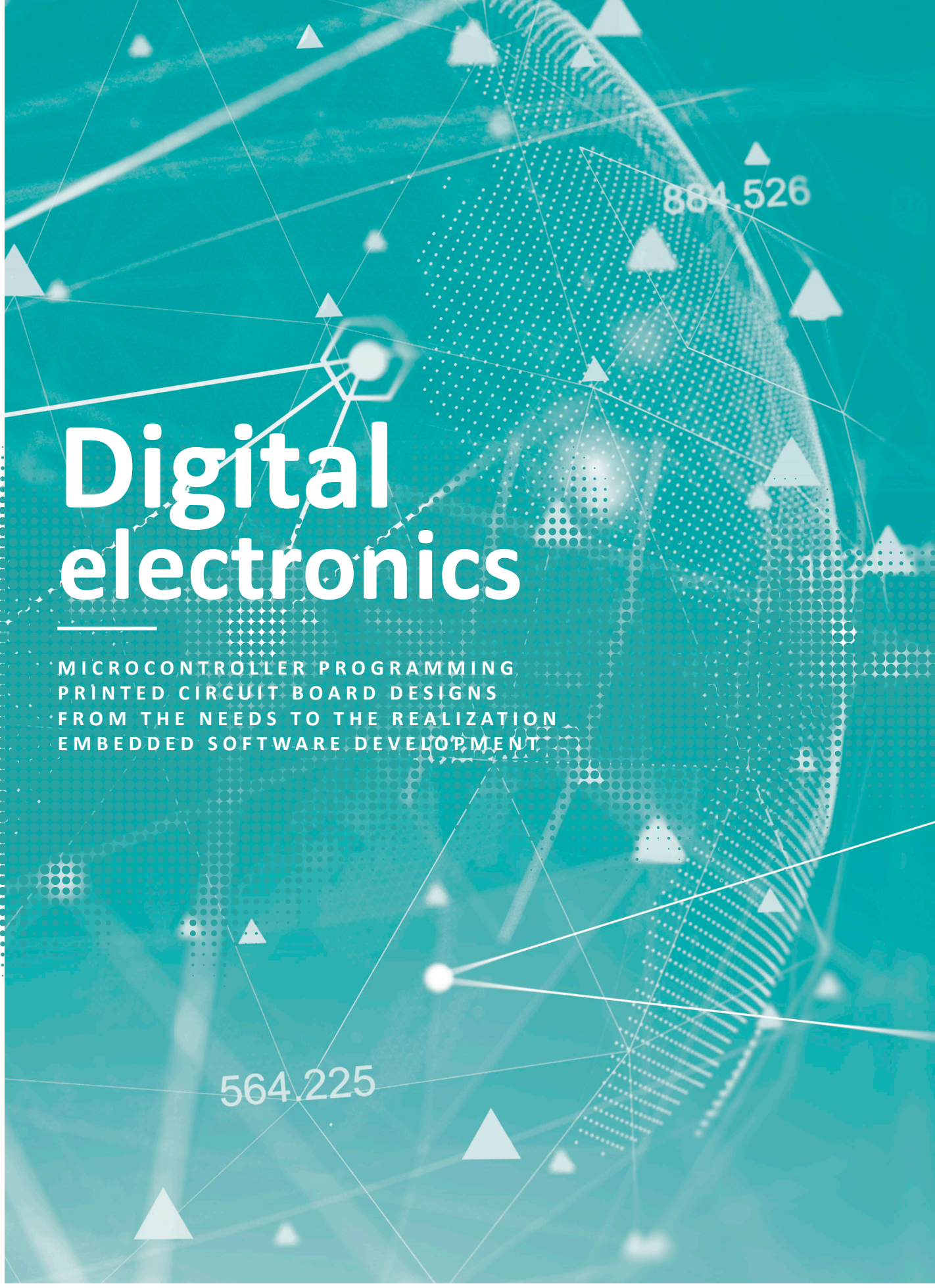


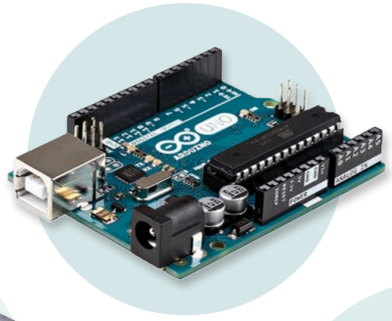
Digital electronics

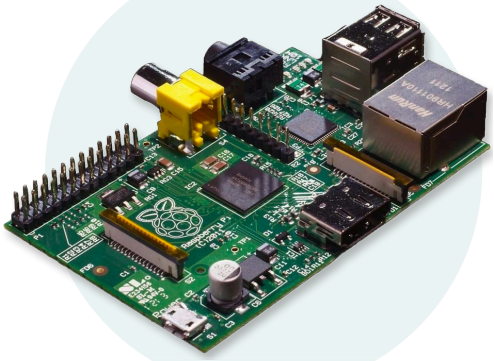
MICROCONTROLLER PROGRAMMING
PRINTED CIRCUIT BOARD DESIGNS
FROM THE NEEDS TO THE REALIZATION
EMBEDDED SOFTWARE DEVELOPMENT

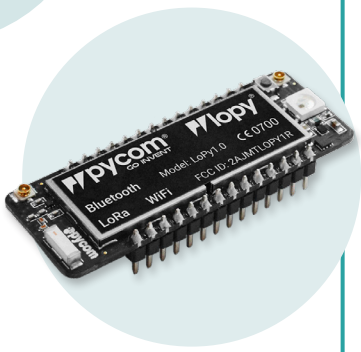
MICROCONTROLLER **PROGRAMMING**

DIFFERENT MICROCONTROLLERS…

• Arduino, Raspberry Pi,
Pycom's Wipy, Lopy
Python, C, C++ …

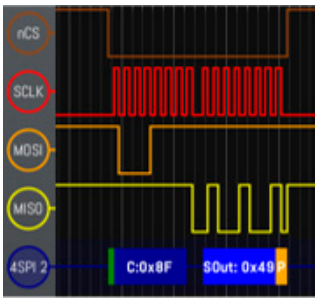


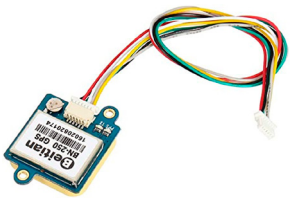


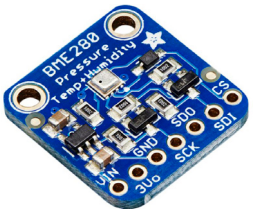


… RUNNING DIFFERENT SENSORS …

• All types of data
• Standard protocols (I2C, SPI, UART …)
• Data measure and formatting







… AND USING DIFFERENT WIRELESS TECHNOLOGIES.

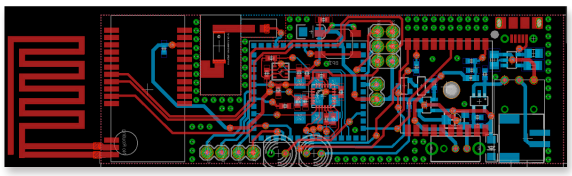
• Classic technologies
(Wifi, Bluetooth …)

• IoT-oriented technologies
(LoRa, Sigfox, Zigbee …)

PRINTED CIRCUIT **BOARD DESIGNS**

PCB CONCEPTION

• Technologies and components are selected depending on the specifications of the wanted object.
• A specific part of the circuit is used to protect the board during charge and discharge

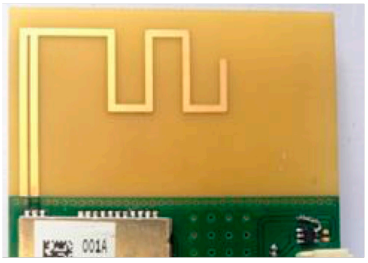


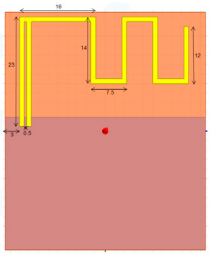
ROUTING

• The components are optimally placed to make the board the smallest, using the two sides of the board.

ANTENNAS

• Elliptika has a lot of experience in the design of planar antennas for PCB, with a reduced sizeand a better gain.





PACKAGING

• Elliptika has several 3D printers, enabling to make a specific packaging for each object, in terms of shape or type of material.

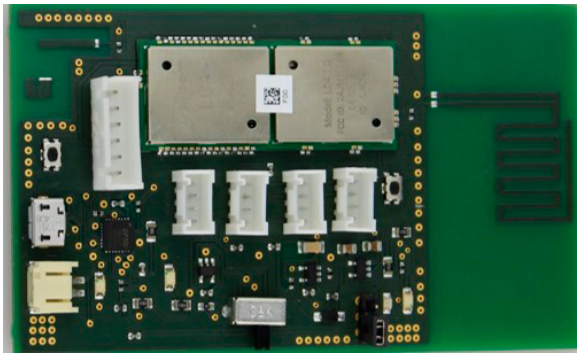
FROM THE NEEDS
TO THE REALIZATION

A GENERIC OBJECT TO VALIDATE THE NEEDS

• Elliptika developed a modular board in order to quickly test any use case.

• Some grove connectors are provided to easily plug sensors, and the classic protocols are supported (I^2C, SPI, UART).

• There are two antennas for radiocommunications :
- a 2.4Ghz one (Wifi, Bluetooth …)
- a 868MHz one (LoRa, Sigfox …)



DATA PROVIDING

THE THINGS NETWORK

Node-RED

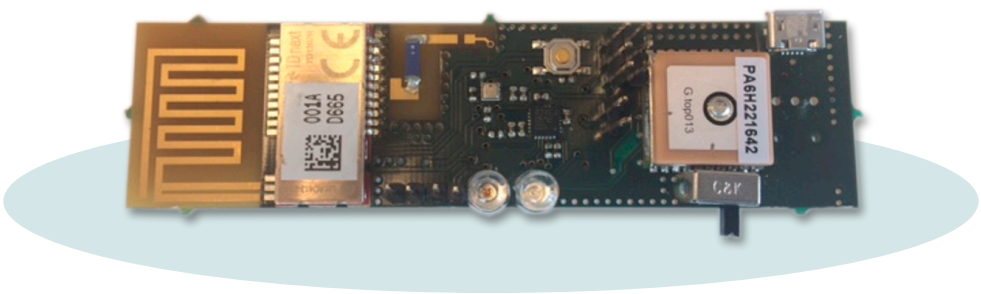
UBO OPEN FACTORY

• Elliptika uses several data management platforms, such as Node-Red or TheThingsNetwork. These platforms allow to stock the data sent by the object, filter it and displaygraphics.

• Moreover, a collaboration with the UBO Open Factory led to the creation of a custom platform, that natively works with the objects made by Elliptika.

CONCEPTION OF A DEDICATED OBJECT

• Once the tests are made with the generic object, Elliptika can design a specific board in order to optimize its operation (choice of sensors, battery capacity, wireless communications technologies …) and its size (removal of useless functions, adaptation of the antennas to suit to the size of the board …)



EMBEDDED SOFTWARE **DEVELOPMENT**

CONTROL OF THE VNA USING LABVIEW

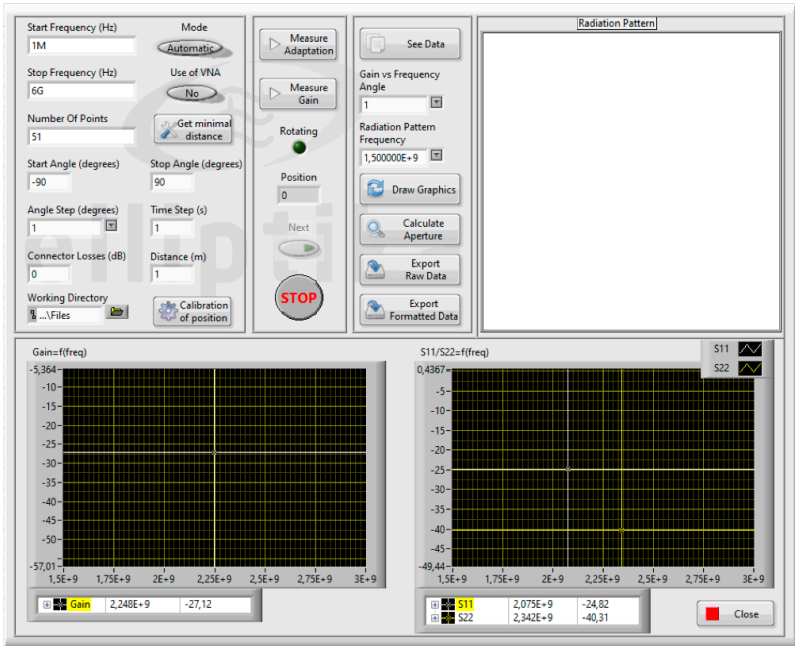
- Choice of acquisition settings
- Data acquisition and transfer to the computer
- Data formatting for useful informations e.g. S-parameters to gain
- Results display (tables, graphics, radiation pattern)

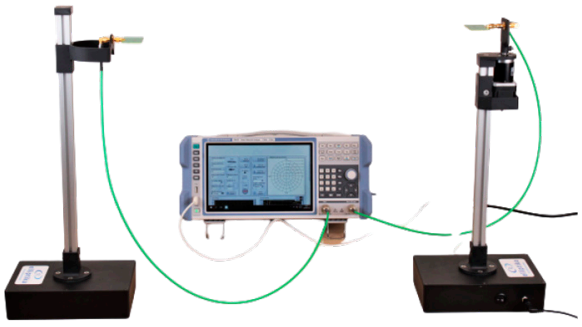
GRAPHIC USER INTERFACE

- Acquisition settings (number of points, frequencies …)

- Launch of measure

- Graphics and export of data in CSV files

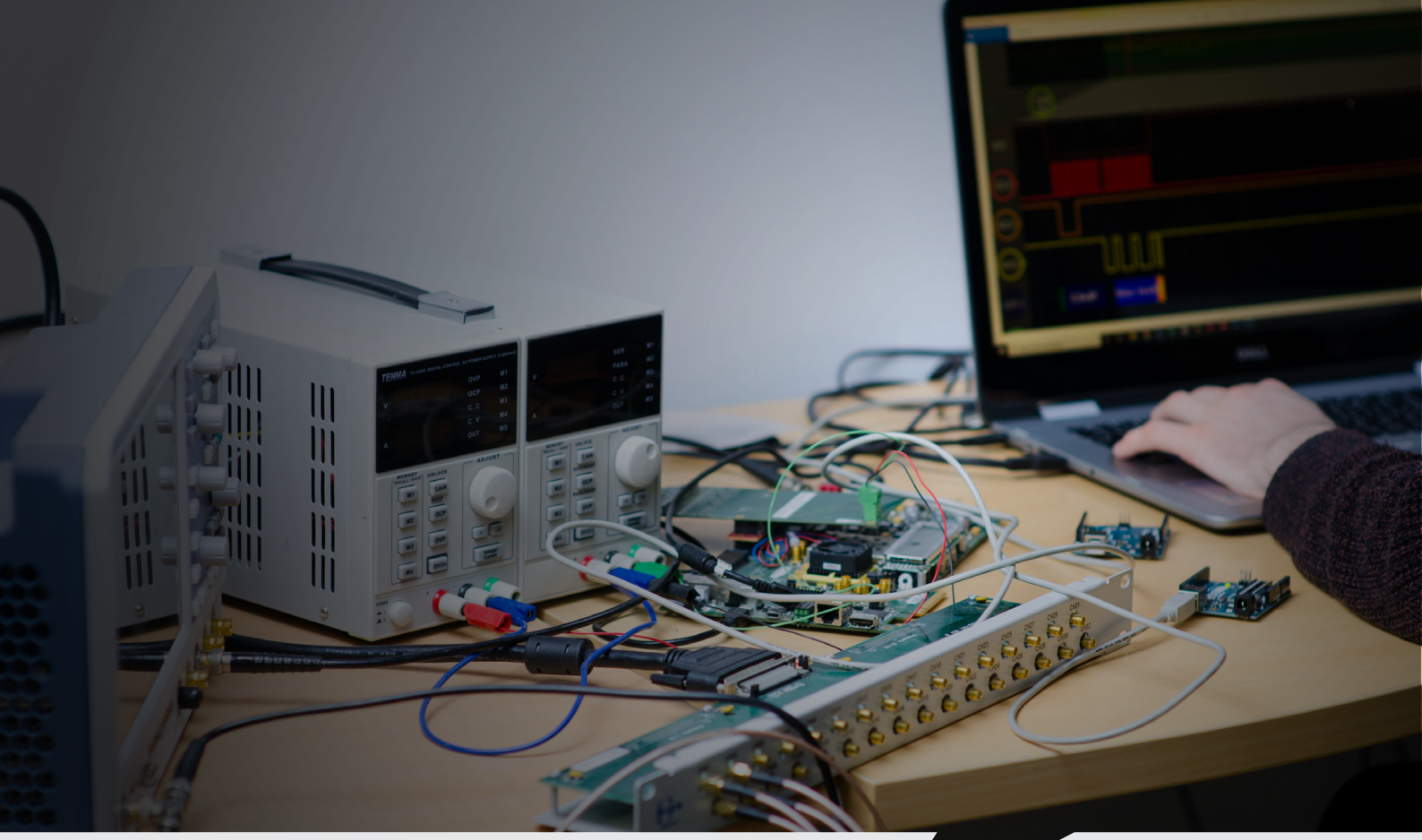




EMBEDDED APPLICATION

- The application can be installed directly on the VNA to be run without a computer.

- Elliptika developed an antenna rotation system to make the process automatic and get an overall mobile setup.



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