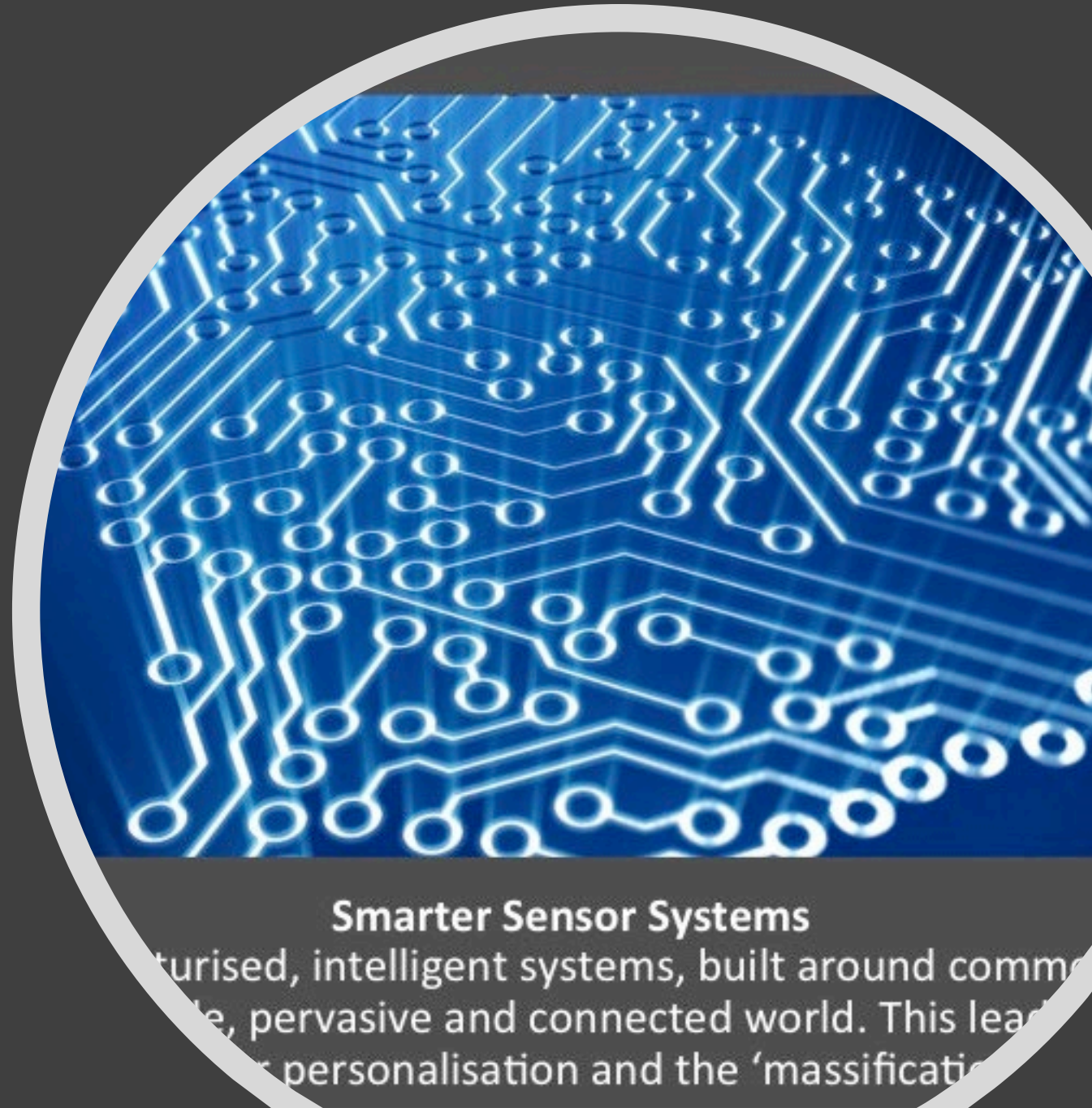


Vincent Claes

IoT Pilootproject

RTC Limburg
Hogeschool PXL



Smarter Sensor Systems

aturised, intelligent systems, built around comm
e, pervasive and connected world. This lead
personalisation and the 'massificatio

Deelnemers

School	Leerkracht	Aantal ln	Klas
Provil Lommel	Frank Meyers	9	5 Industriële ICT
TI Sparrendal	Chris Vandekragt	4	6 Industriële wetenschappen
campus Hast	Tim Stevens	8	5 Industriële wetenschappen

Internet Of Things

A central laptop with a light blue screen and a yellow base. The screen displays the text "Internet Of Things" in a dark blue, sans-serif font. White lines radiate from the laptop, connecting it to a variety of icons representing different types of IoT devices and concepts. These include a lightbulb (top left), a microphone (top left), a speech bubble (top center), a Wi-Fi symbol (top center), a satellite (top right), a server rack (top right), a play button in a circle (top right), a smartphone (middle right), a heart in a speech bubble (middle right), a floppy disk (bottom right), a camera (bottom right), a battery (bottom right), gears (bottom center), an open book (bottom center), a star (bottom center), a padlock (bottom left), a printer (bottom left), a router (bottom left), a document with a blue circle (middle left), and a play button in a circle (middle left). The background is a dark teal color with faint, larger-scale circular patterns.

1

Connect to the network



Orange IoT connectivity

2

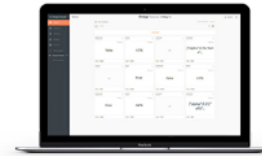
Collect your data



From your Orange NB-IoT
Rapid Development Kit

3

Visualise your data



Orange Maker
Powered by AllThingsTalk

4

Use your data



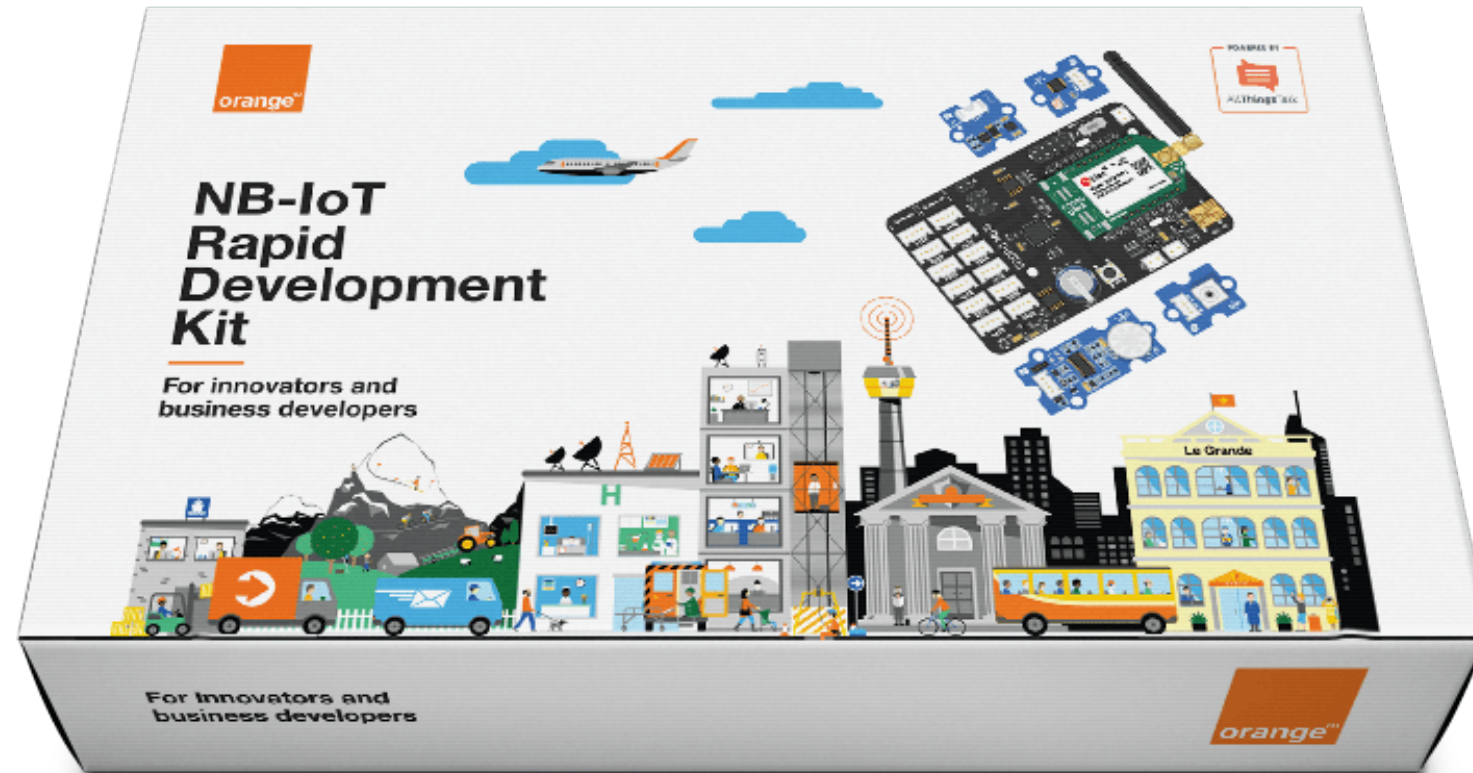
Experiments



Pilootproject

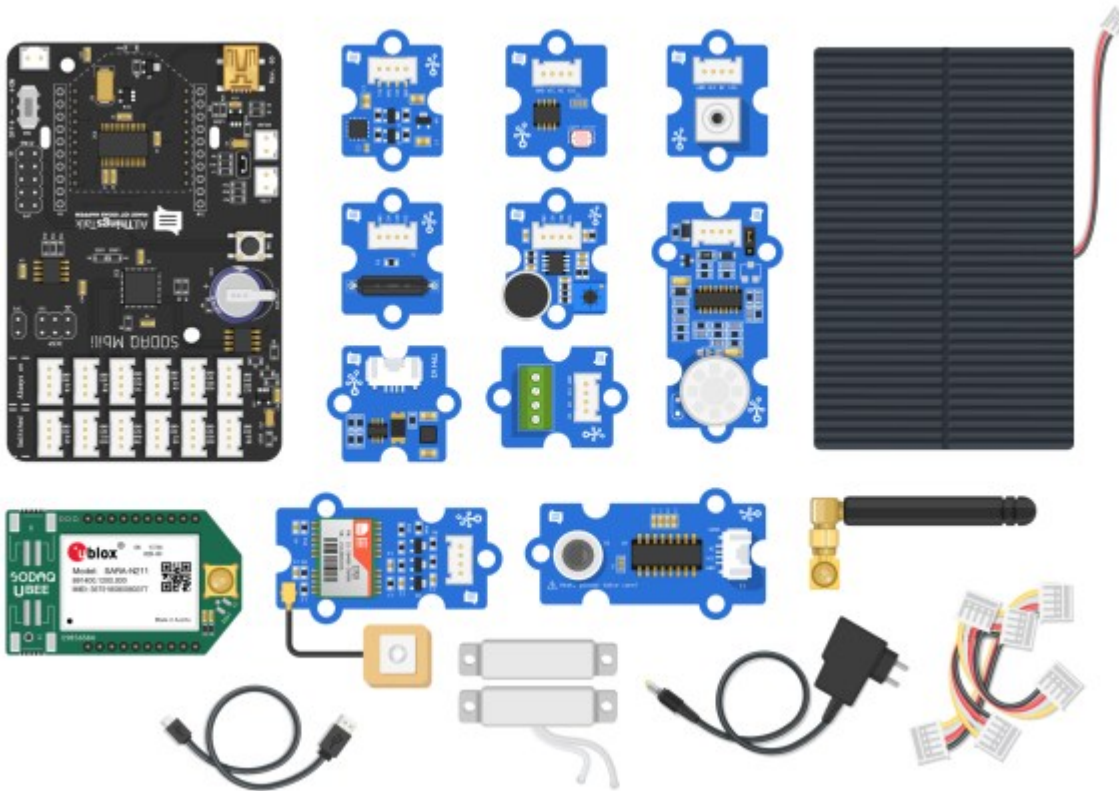
- De deelnemers komen in aanraking met de belangrijkste topics van **Internet-of-Things** systemen zoals:
 - *Sensoren*
 - *Sensor Netwerken (Low Power)*
 - *[Sensor] Gegevens [Data] visualiseren*
 - *Programmeren*

Rapid Prototyping Hardware



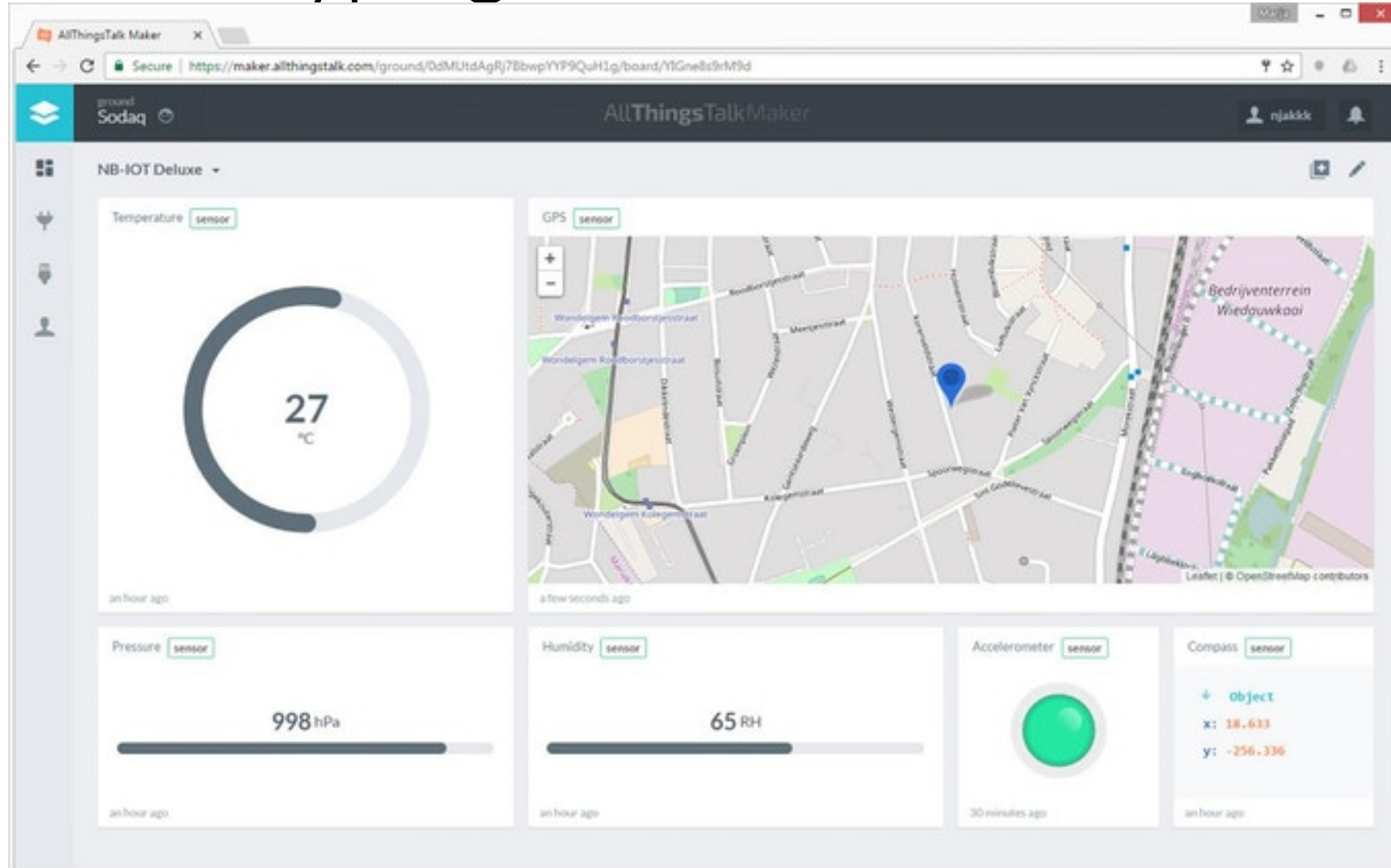
Sensoren

NB-IoT Starter kit



- **uBlox SaraN211 module**
- **Antenna**
- **1.5W Solar panel**
- **Lithium Polymer Battery 1200mAh**
- Grove – Button
- Grove – **Light sensor**
- Grove – PIR motion sensor
- Grove – **Temperature – pressure – humidity sensor**
- Grove – 3-Axis Digital Accelerometer
- Grove – Sound/Loudness Sensor
- Grove – **GPS module**
- Grove – Air quality sensor (Indoor)
- Grove – Tilt switch
- Grove – Magnetic door switch & screw connector

Rapid Prototyping Software



- <https://maker.allthingstalk.com>

Case Study: Luchtkwaliteit

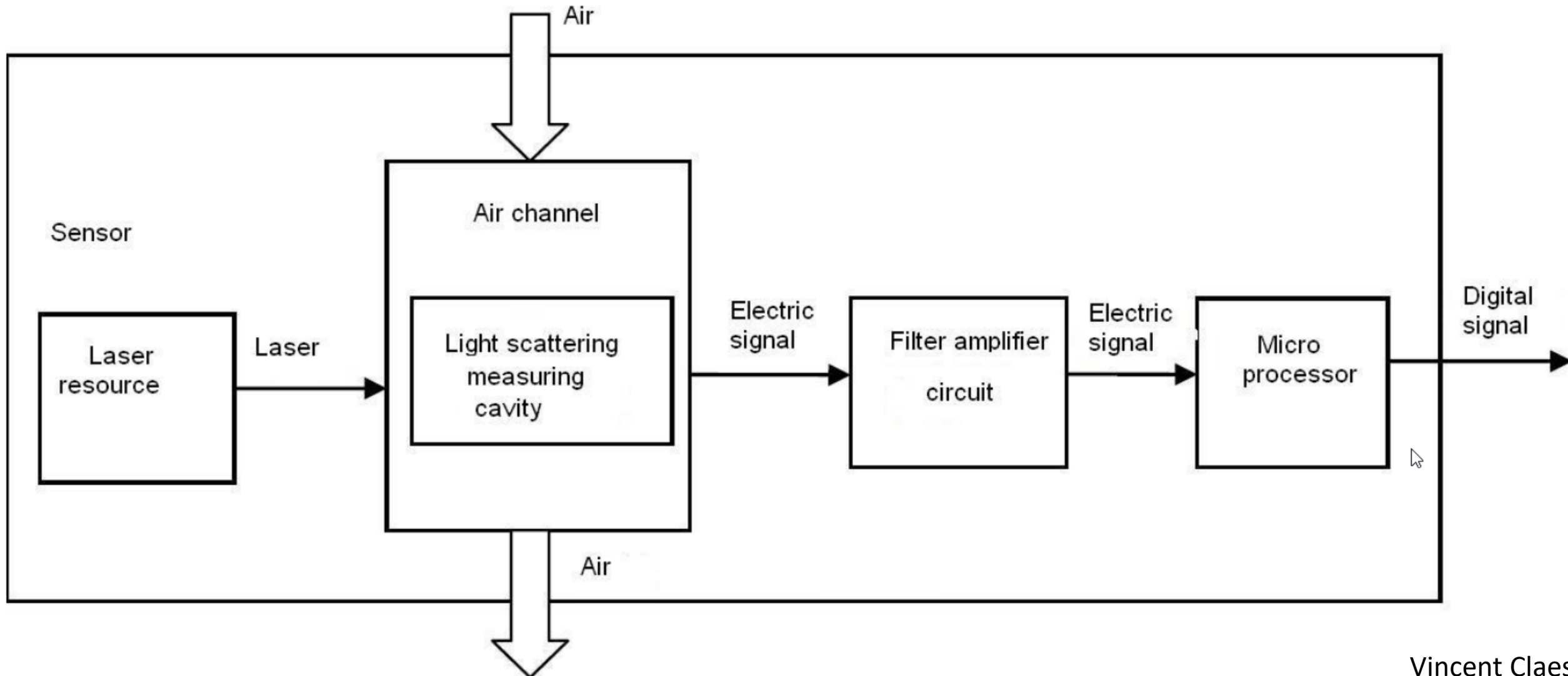
- PM3015 laser particle sensor module
- Deeltjes van $0,3\mu\text{m}$ ~ $10\mu\text{m}$
- Output van sensor: PM1.0, PM2.5 en PM10 in $\mu\text{g}/\text{m}^3$
- Industrial Grade



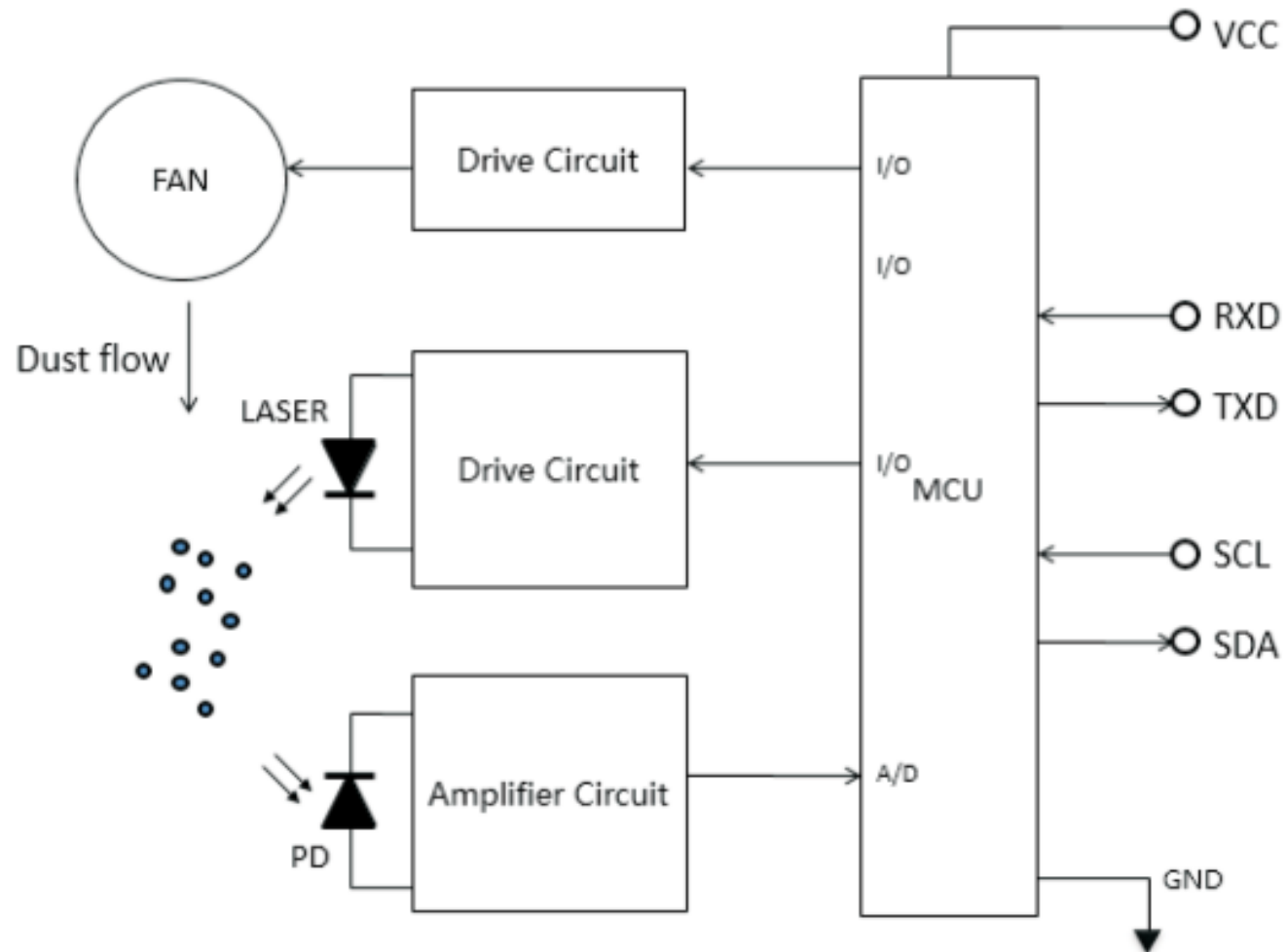
Applications

- Outdoor air quality monitoring
- Environmental monitoring

Case Study: Luchtkwaliteit



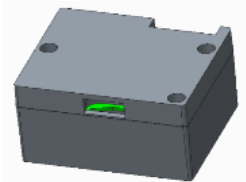
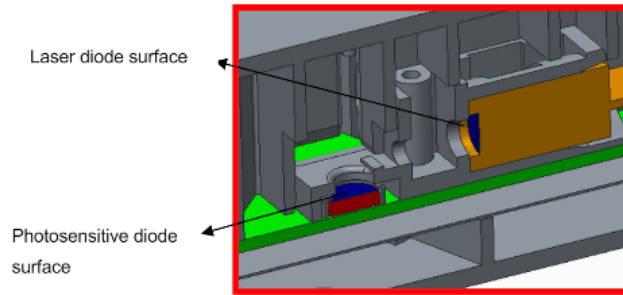
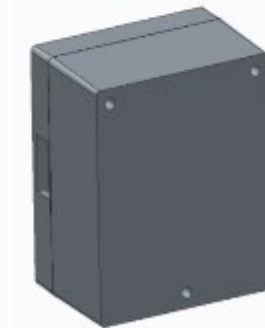
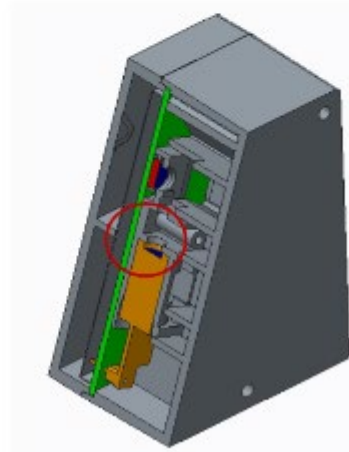
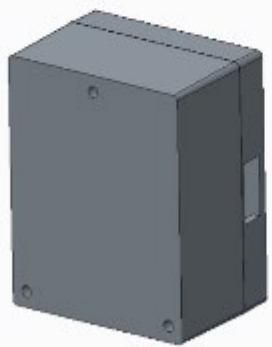
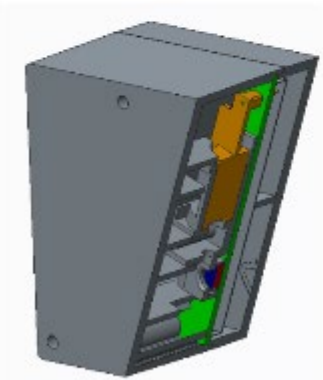
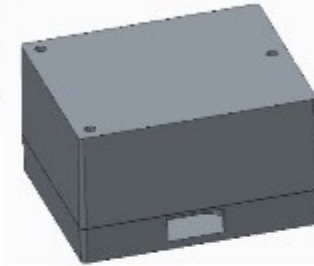
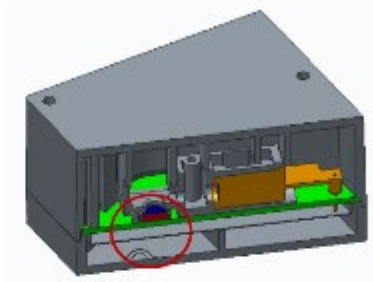
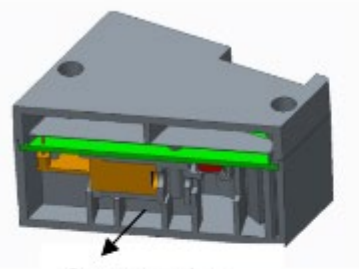
Case Study: Luchtkwaliteit



Case Study: Luchtkwaliteit

Recommended Installation

Non Recommended Installation



Case Study: Luchtkwaliteit

- Connectie Sensor (Hardware en Software)
 - UART interface
 - 3,3V ⇔ 5V
- Air inlet / outlet
- Behuizing (onze hardware moet herbruikbaar zijn voor volgend jaar, waterdicht, monteerbaar op fiets, ...)
- Data Visualisatie

Gebruikt Materiaal

- **Stap 1: Hardware van Orange Maker Kit [SODAQ]**
 - Arduino IDE
 - Gebruik van 3-Axis Digital Accelerometer en GPS module
 - Gebruik van Magnetic door switch en Push button
 - Gebruik van Light, Temperature, Pressure, Humidity, sound level en air quality (indoor) sensoren
 - Experimenteren
- **Stap 2: Software van AllThingstalk (Gegevens visualisatie)**
 - Grafische Webomgeving Allthingstalk gebruiken
 - Data Visualisatie
 - Experimenteren
- **Stap 3: Case Study**
 - Nieuwe Sensor implementeren (aansluiten, gebruik)
 - Behuizing bouwen voor sensorsysteem
 - Data Visualisatie voor Case Study
- **Stap 4: Presentatie en demo van gerealiseerd project**

Planning

- Stap 0: Kick-off moment met Leerkrachten
 - **28 / 01**
- Stap 1: Hardware workshop, Kick-off moment met studenten
 - In Februari => **19/02**
- Stap 2: Gegevens visualisatie
 - In Februari / Maart => **19/02**
- Stap 3: Case Study setup workshop
 - In Maart [TBD]
- Stap 4: Slotmoment
 - [TBD]

Contact gegevens

- frank.joosten@pxl.be
- vincent.claes@pxl.be
- Rinaldo.Menichetti@rtclimburg.be