



# Low-Cost Wireless Sensor Node for Smart Agriculture Applications

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# Motivation

- Uncertain and unpredictable weather
- By 2050 population will be 9.1 billion
- Food production enhanced by 70 percent
- Advancement in agriculture productivity is required
  
- Low presence of IoT in agriculture
  - Location
  - Price

# Related work

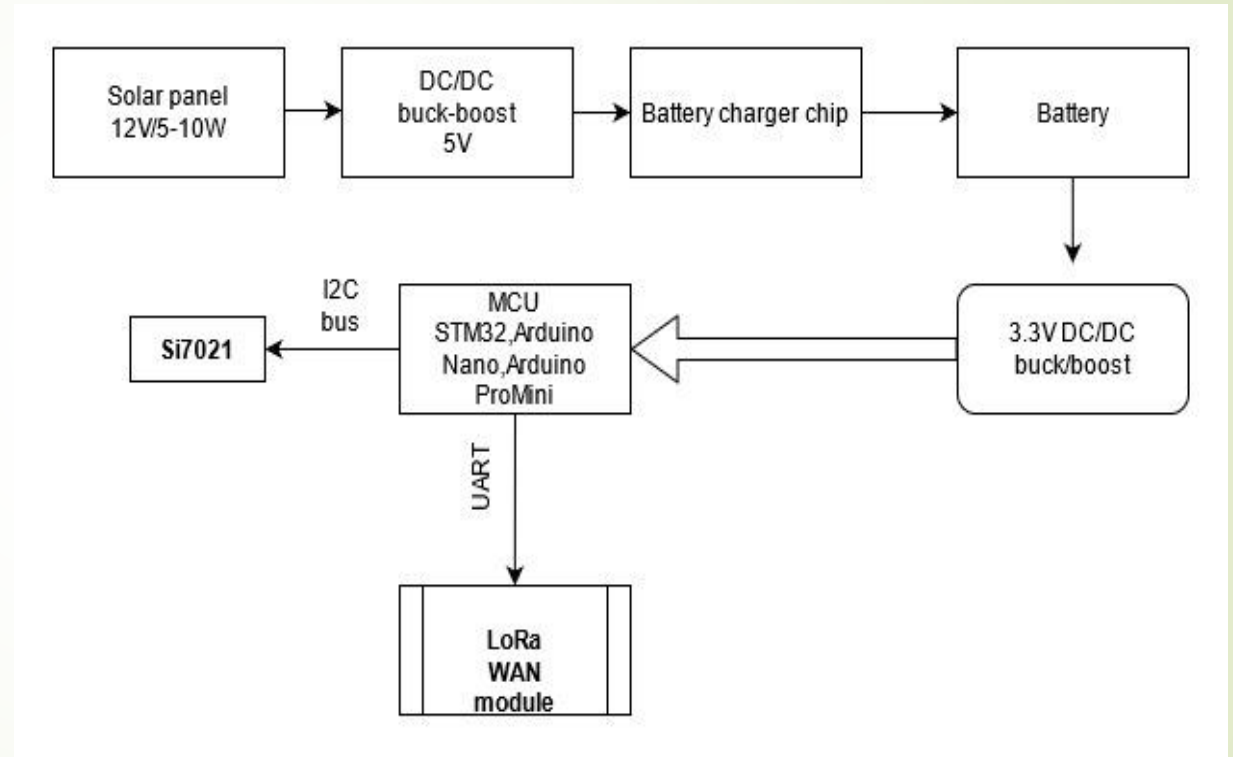
- Communication technology
  - Wi-Fi
  - Bluetooth
  - ZigBee
  - 3G/4G
  - LoRa
- Parameters monitored
  - Temperature
  - Humidity
  - Pressure
  - Rain

# Sensor node requirements

- Long-range of communication
- Low power consumption
- Secure
- Durability
- Reliability
- Low price

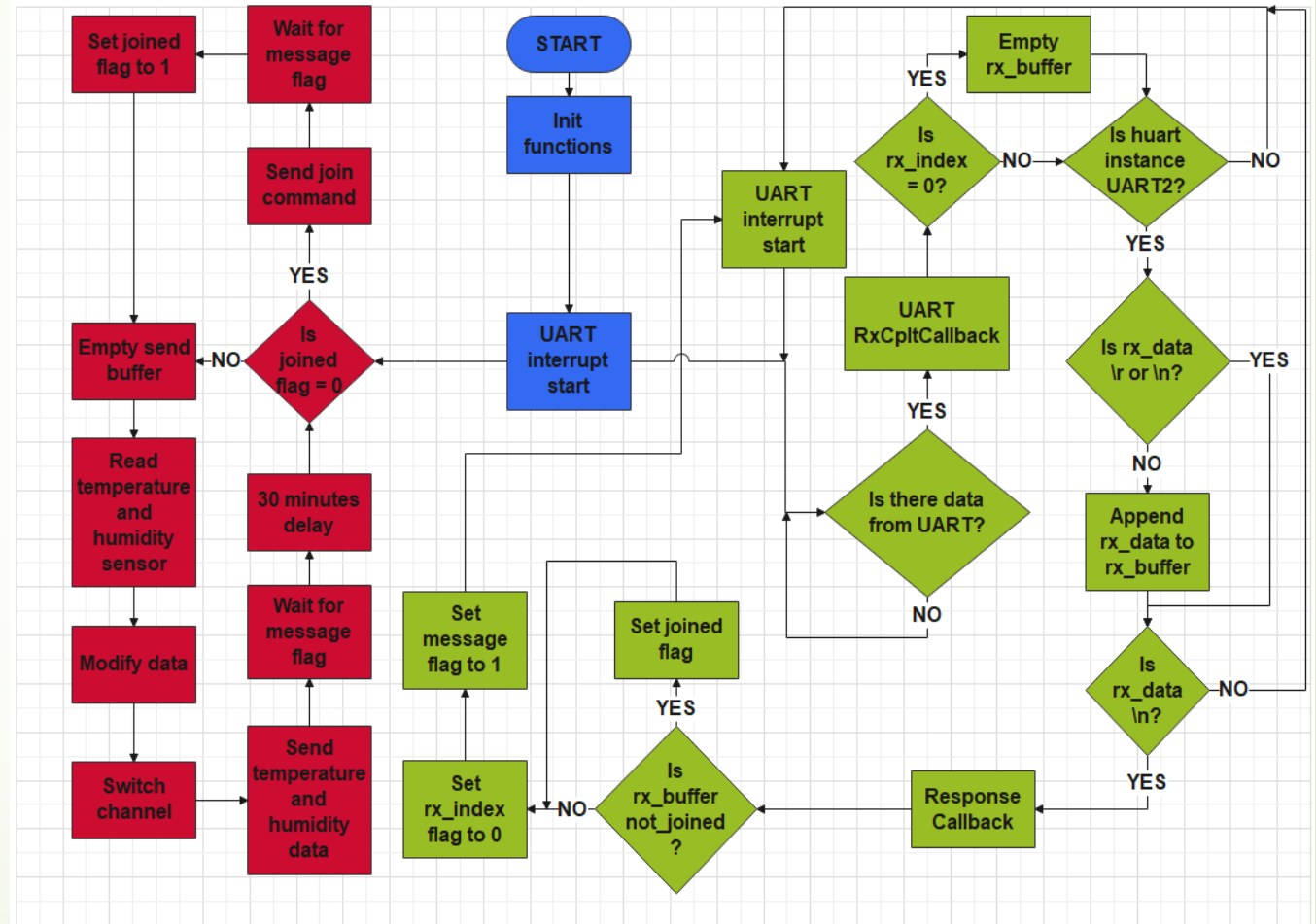
# Hardware

- STM32G030
- RN2483
- Solar charger
- DC / DC converter
- Si7021



# Software

- CubeMX
- SW4STM32
  
- Initialization
- Data acquirement
- Data transmission
- Control



# PRICE

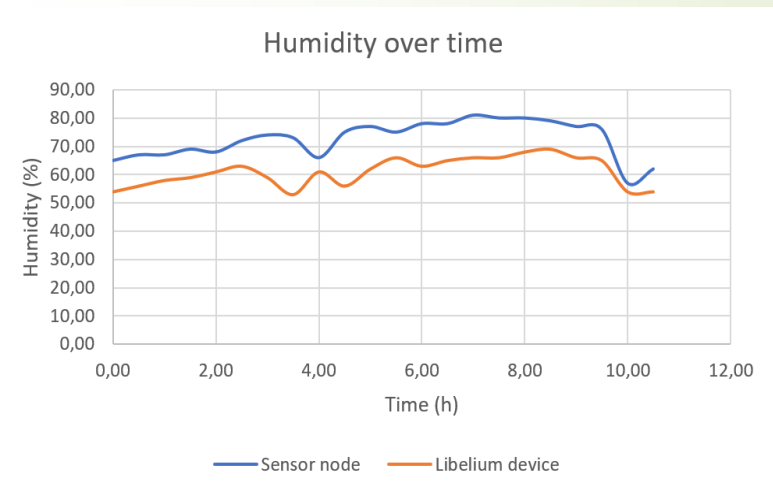
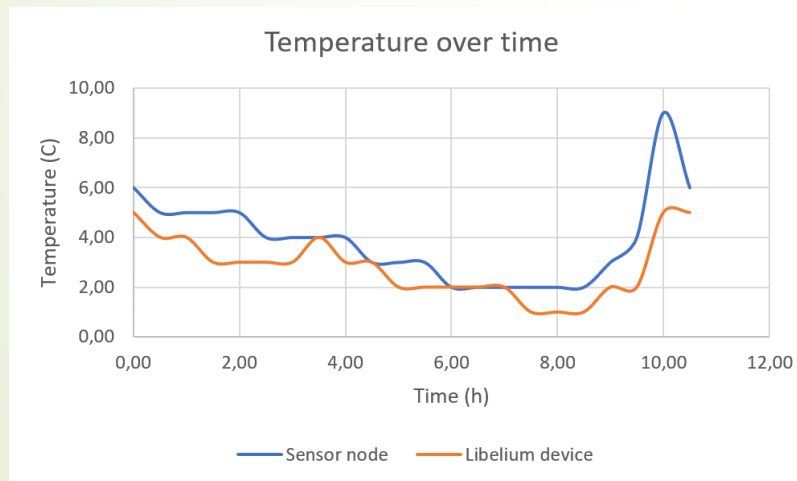
- MeteoHelix IoT Pro - Sigfox
- MeteoHelix IoT Pro - LoRa
- Libelium-Gill-EX-Machina -Lorix
- Custom designed Sensor node

Weather station	Specifiction	Price
<b>MeteoHelix® IoT Pro - Sigfox Micro-Weather Station</b>	Sigfox, Temperature, Humidity, Athmospheric pressure, Solar charger	499€
<b>MeteoHelix® IoT Pro - LoRa Micro-Weather Station</b>	LoRa, Temperature, Humidity, Athmospheric pressure, Solar charger	499€
<b>Libelium-Gill-EX-Machina-Lorix Smart Weather Forecast LW Solution Kit</b>	LoRa, Temperature, Humidity, Pressure, Wind and Precipitation	4150€
<b>Our designed Sensor node</b>	LoRa, Temperature, Humidity, Solar charger,	250€



# RESULTS

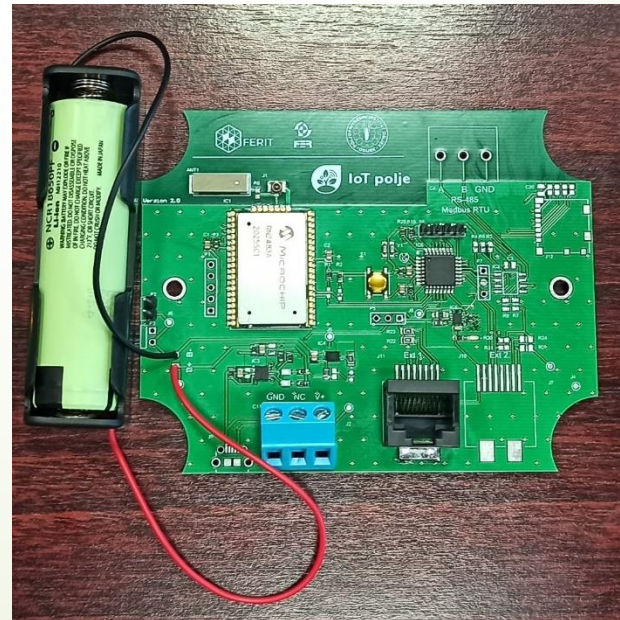
- Temperature correlation
- Humidity correlation





# Custom device

- Two components
  - Enclosed device
  - Stevenson screen



# Conclusion

- Practical
- Reliable
- Long battery life
- Long-range of communication
- Low cost

Thank you for your attention

Questions?