



# ASYGN

## Battery-Less UHF RFID Sensors

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### SÉMINAIRE

Capteurs au service des économies des ressources

# 06 JUIN 2023

# ASYGN AT A GLANCE



Copenhagen, Denmark

- Headquartered in **Grenoble**
- Created in **2008**
- **50 people**

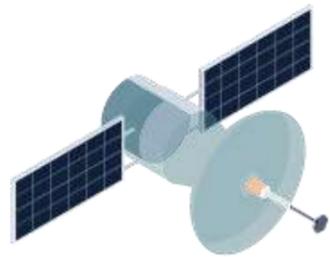
Atlanta, GA, USA



Grenoble, France, HQ

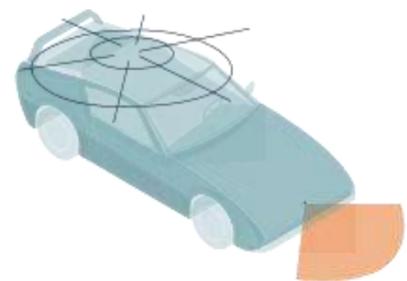


# ASYGN ACTIVITIES



## RF & mmW

High-speed ADC  
Beamforming  
Automotive radar  
MIMO Architectures



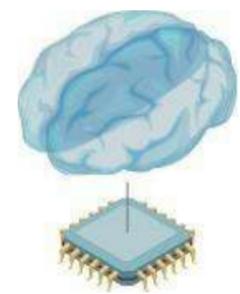
## INERTIAL

AS40xx IC series  
for accels, gyros,  
resonators.  
Custom ASIC  
and Systems



## RFID sensors

AS321x IC series Battery-free,  
RAIN compliant T°, RH, Strain,  
Light sensors and more..  
Market : Get rid of batteries  
in wireless Industrial IoT And  
Predictive Maintenance

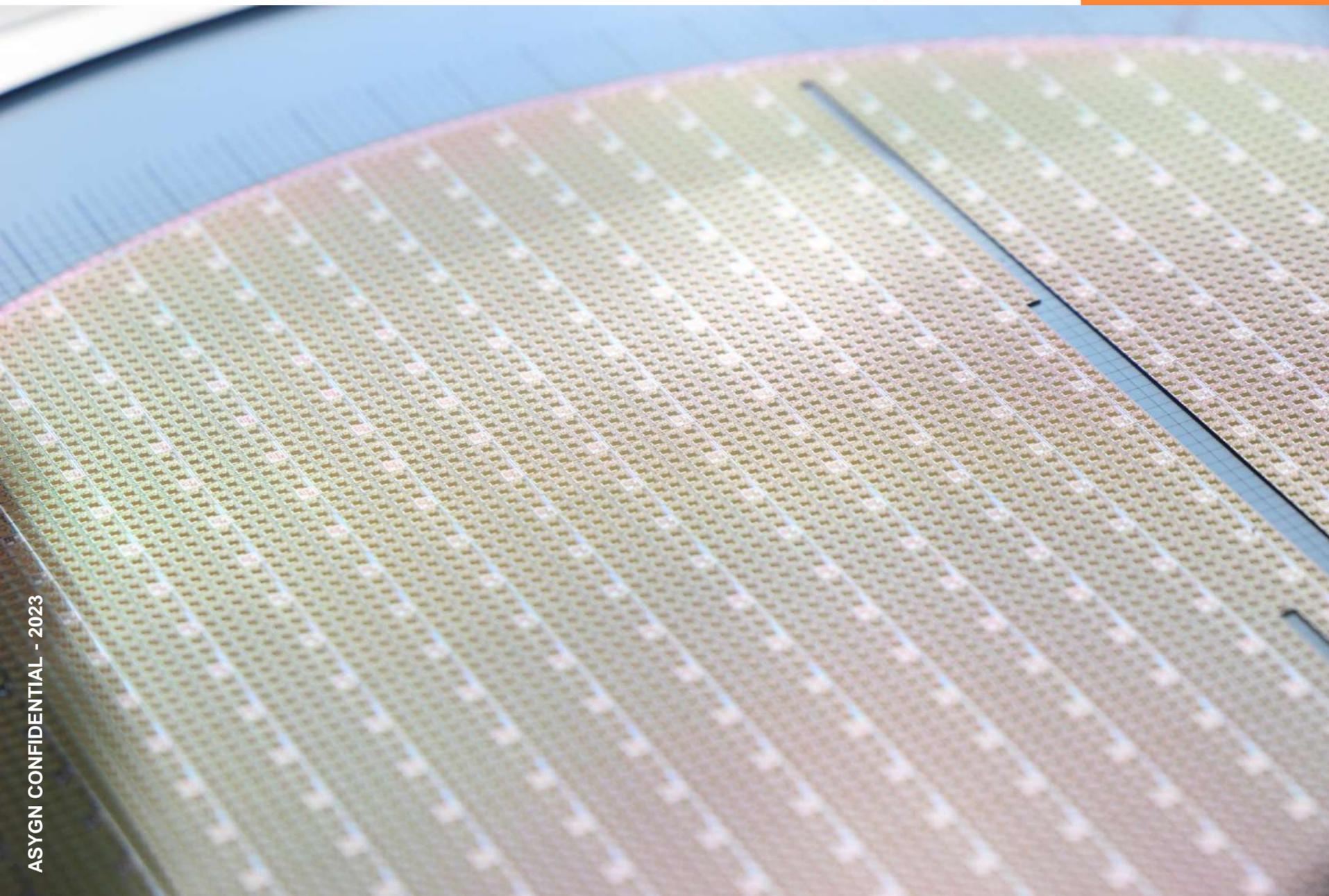


## AI

AS6001 System  
Edge Low-power  
computer  
vision

# UHF RFID Sensors IC

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## Patented technology

2 patents granted for an innovative **Battery free** UHF RFID IC family (world first UHF RFID sensing IC)

## Fully owned

No external IPs  
All devices designed internally

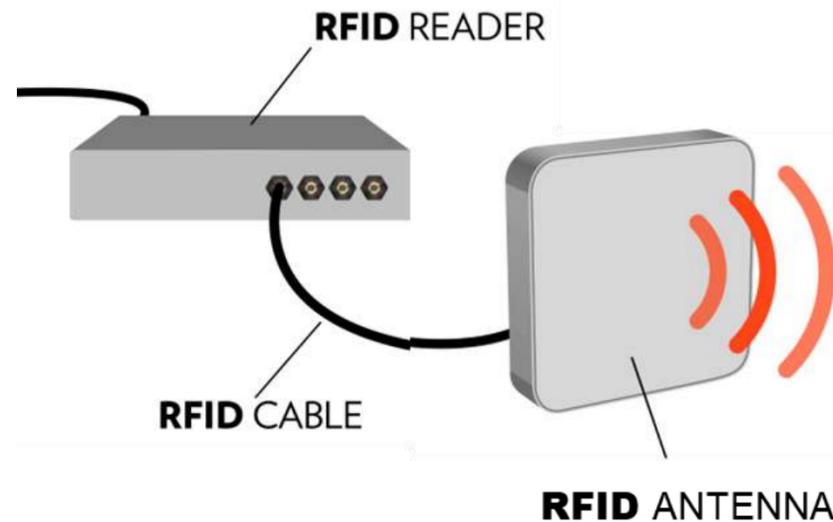
# EASY TO OPERATE

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Simply attaching an RFID Sensor Tag to the object you wish to monitor...



ASYGN CHIP



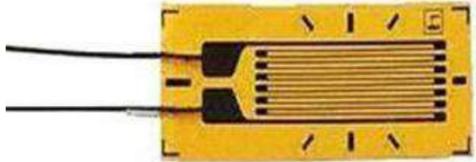
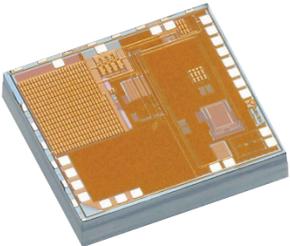
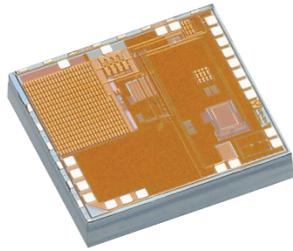
And read it up to several meters away with any **RAIN RFID Reader**

# How does it work ?

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- The chip receives power from the RFID reader  
performs an acquisition at each inventory round
- Just behaves like standard UHF RFID Chip
  - no special sequence, no custom commands
- It returns on demand both:
  - the tag unique ID (EPC number)
  - the sensor data (**read command or inventory command**)

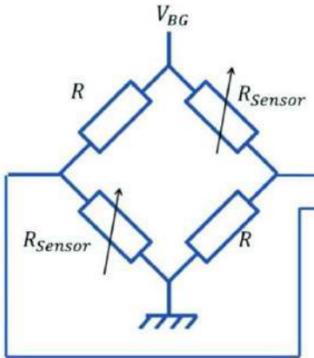
# The RFID IC AS321X family



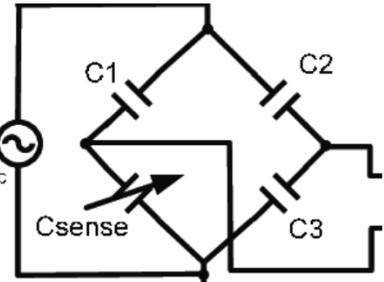
## IC with internal sensors

- 
**AS3213\_T**
- 
**AS3213\_RH**
- 
**AS3213\_S**
- 
**AS3213\_L**

## IC with external sensors interface



**AS3212: resistive sensors**  
*Strain gages, thermocouple, piezoresistive sensors*



**AS3213\_C: capacitive sensors**  
*Accelerometer, capacitance, permittivity*



# Focus on AS3213\_RH

- AS3213\_RH.3 (engineering version)
  - Available as bare dies and now in BGA package
  - 5-6ku available for sampling and POC
  - RH measurement range: 0 – 100%
  - Sensitivity: 4.5LSB / %RH
  - Temperature measurement range: -40°C – 125°C
  - Sensitivity: 2.9LSB / °C
- AS3213\_RH.6 (production version)
  - Planned for Q1/24
  - Will be available as bare dies (16ku per wafer) and in BGA package
  - Same input impedance as AS3213\_RH.3
  - Improved RH sensor sensitivity: 1.8LSB / %RH
  - Same temperature sensor



# Application examples



## **AGRICULTURE** T°/humidity/Light sensors

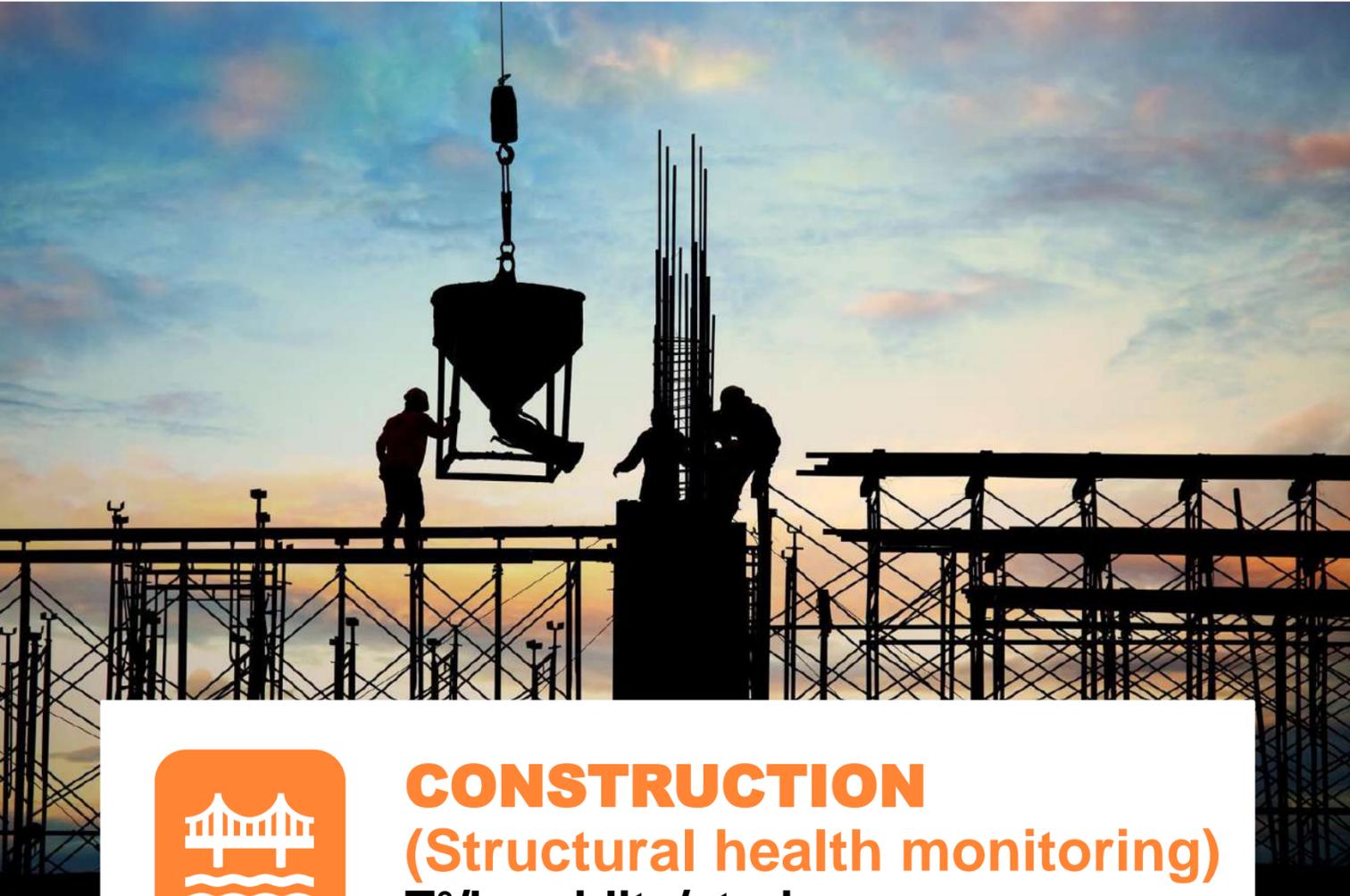
- Adapting watering conditions based on real-time humidity reports
- Optimize water & chemicals supply based on real needs
- Efficient use of lighting in greenhouses



## **LOGISTICS** T°/motion sensors

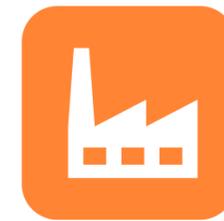
- Use a passive weigh scale using RFID strain sensors
- Permanently monitor supplies level
- Applies to small objects (nuts, bolts, screws, nails) and liquids (paint, oil,...)

# Application examples



**CONSTRUCTION**  
(Structural health monitoring)  
T°/humidity/strain sensors

- Detect changes (cracking) in structure, buildings, grounds
- Monitor concrete formation



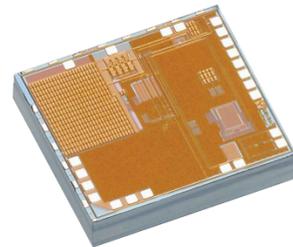
**INDUSTRY**  
(Predictive Maintenance)  
T°/strain sensors

- Anticipate wear and breakdown
- Preventing overheating of rotating equipments

# What does ASYGN offer ?

ASYGN is an IC designer and provider company

IC



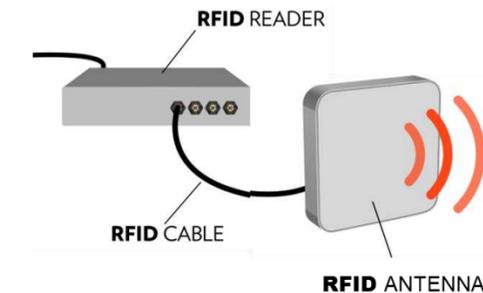
Our core business

Tags



Partnership with  
main tag makers

Readers



Standard readers are used  
No specific dev.

# A selection of tag maker partners

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T°, strain and light flexible tags



T° and strain hardened tags



T°, strain and light flexible tags

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## Temp hardened tags

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# More than that ...

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## ASYGN will bring you support

- Sensor integration in harsh environment
- Antenna design and service for specific environment
- Full team of application engineers in Sensor and RFID

## ASYGN will share its partner network

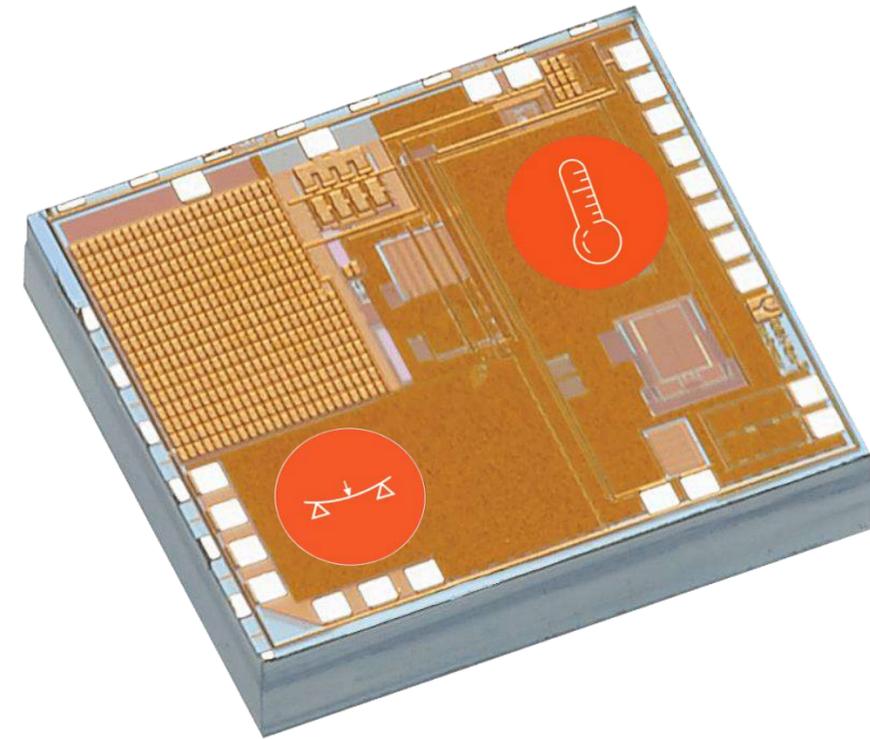
- Tag manufacturers
- Reader manufacturers
- Solution providers, integrators, such as





# THANK YOU !

[www.asygn.com](http://www.asygn.com)



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