



# Asystem

## Company and Product overview

Version 3 – October 27<sup>th</sup> 2020

### 1. Organisation

Asystem SAS is a French company specialising in Predictive Maintenance solutions for Industry and registered at 287 rue Jean Fourastié - 11400 Castelnaudary (France); the development center is in Toulouse at 10 avenue de l'Europe - 31520 Ramonville Saint-Agne (France).

Asystem products are exclusively developed within our R&D departments which ensures that we have complete control of our solutions.

### 2. Product availability

Asystem launched AsystemPredict solution to the market in mid-2018. Since then over 50 large industrial organisations have adopted it.

Three versions of AsystemSentinel, Multi-Sensor Device, are available:

- Indoor standard device with or without Smart Probe
- Outdoor AsystemSentinel - Multi-Sensor device with Smart Probe (IP66)
- EX AsystemSentinel - New ATEX/IECEX Multi-Sensor device with Smart Probe (**IEX ib II C T4 certified**) launched by end 2020.

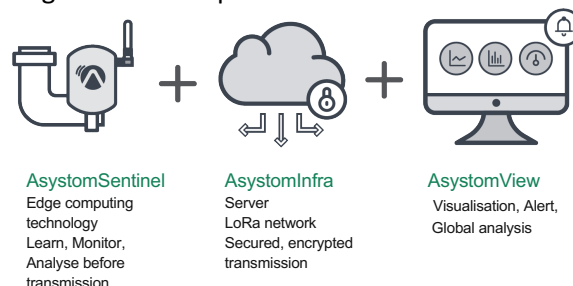
The products are currently shipped in France, Italy, USA, UAE, Singapore, South Asia.

### 3. AsystemPredict:

AsystemPredict is a turnkey, global, universal and autonomous predictive maintenance solution for industrial equipment.

- Designed for anomaly detection based on machine learning, Asystem provides a universal solution for monitoring machines of different ages and designs, without installation constraints.
- This non-intrusive technology can be installed on a very large scale, independently of the existing infrastructure.
- Thanks to its embedded intelligence, it is able to predict possible failures, drifts and anomalies such as leaks, wear or electrical faults.

Our technology was made possible by a clear technological choice which consists of distributing the intelligence of our solution between the beacon (close to the machine) and the cloud server. The architecture is modular through 3 main components:




The **AsystemSentinel** beacon is a smart, connected, autonomous device capable of managing numerous integrated sensors (sound, vibration, **ultrasound**, shock, ambient and contact temperature, ambient humidity). The outdoor version also offers the possibility of connecting external sensors: 4 -20 mA, Thermocouple, Dry contact, PT 100.

The beacon is non-intrusive and is glued on the equipment. No wiring or specific other set-up is required.





AsystemSentinel is an “intelligence at the edge” device with an embedded, powerful, real-time microprocessor to manage the built-in sensors, calculating a machine signature before sending the results through the LoRa network.

The Multi-Sensor Device has a machine learning capability which establishes the machine’s normal behaviour. Then it collects, analyses equipment operating data and transmits the results through a secure LoRa (Long Range) wireless network. Configuration is managed remotely.



# Asystem Sentinel Analytic

**AsystemSentinel Models**

 <div style="background-color: #008000; color: white; padding: 5px; border-radius: 10px; text-align: center;"> <b>EX</b> ATEX/IECEx Zone 1           </div> 	<div style="background-color: #008000; color: white; padding: 5px; border-radius: 10px; text-align: center;"> <b>Outdoor</b> IP66           </div> 	<div style="background-color: #008000; color: white; padding: 5px; border-radius: 10px; text-align: center;"> <b>Indoor</b> </div> 
<p><b>Multi-sensors</b></p> <ul style="list-style-type: none"> <li>• Tri-axial Vibration</li> <li>• Ultrasound</li> <li>• Sound</li> <li>• T° surface</li> </ul>	<ul style="list-style-type: none"> <li>• Tri-axial Vibration</li> <li>• Ultrasound</li> <li>• Sound</li> <li>• Gyroscope (*)</li> <li>• Shocks (*)</li> <li>• Optional external 4-20mA, Dry Contact, T° Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• Tri-axial Vibration</li> <li>• Ultrasound</li> <li>• Sound</li> <li>• T° Ambient</li> <li>• T° Surface</li> <li>• Humidity</li> <li>• Pressure</li> <li>• Gyroscope (*)</li> <li>• Shocks (*)</li> </ul>
<p><b>Autonomy</b></p> <p>Up to 8 years autonomy with 4AA battery</p>	<p>Up to 8 years autonomy with 4AA battery. Optional external power supply</p>	<p>Up to 5 years autonomy with 2AA battery</p>
<p><b>Edge AI</b></p> <ul style="list-style-type: none"> <li>• Powerful calculation capacity. Auto learning.</li> <li>• Algorithms for prediction of dysfunctions and drift               <ul style="list-style-type: none"> <li>• LoRa WAN connectivity</li> </ul> </li> <li>• Encrypted and Secure data transmission</li> </ul>		

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(\*) on project basis

**NOTE:**

- Outdoor and EX versions integrate 4 xAA batteries extending product life up beyond 8 years.
- Shock and gyroscope sensors are on project basis – please consult us.

**AsystemInfra** consists of the network, the server and the application. Asystem, through a secure LoRa gateway, deploys a network in a few minutes. Each customer benefits from an individual, private, on-cloud server, that collects data from the beacons across the network.

Available options:

- Asystem can adapt its architecture to connect to a company LoRa WAN private network after technical review with the appropriate team.
- The Server can be deployed on premises.
- Access to data is through a REST API.

**AsystemView**, is a web viewing platform that allows a global and detailed view of the status of each machine. The management of the beacons, the alerts and tags are carried out from the application.

## 4. Installation and Support

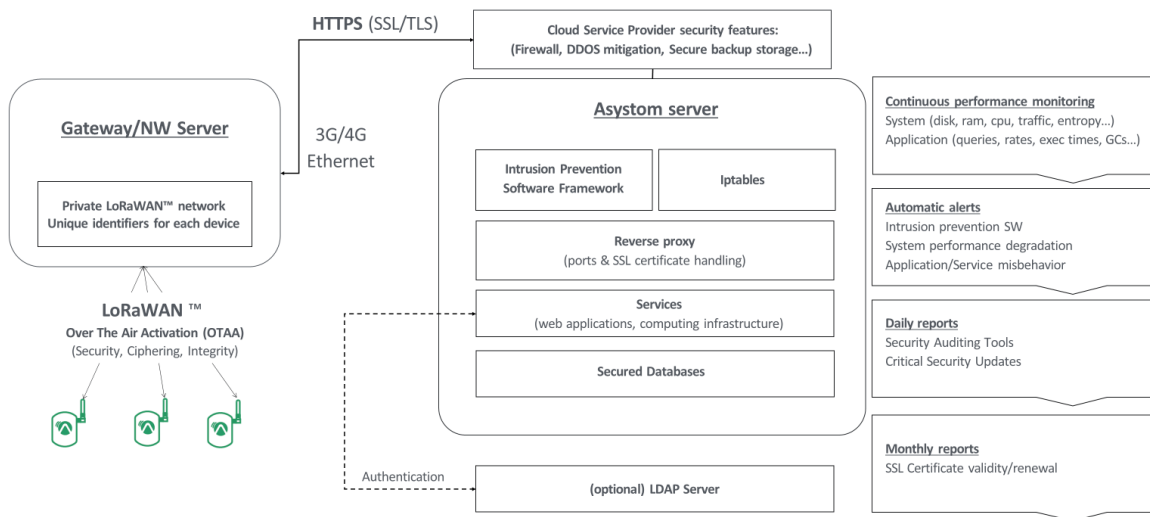
Because the Asystem solution is fully manageable remotely, technical support during installation and over the life of the product is designed for remote support. All parameters, including network set-up, are accessible through AsystemView and special utilities for gateways.

## 5. Security

Asystem solution is built with a strong focus on security. All data transferred are encrypted. Below is an overall architecture of the data flow:



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3 - Confidential Information

### Asystem solution key benefits

- Collection of reliable and quality data through intelligent processing and analysis of information.
- Multi-sensor technology for cross-measurements providing better failure detection capacity and a future basis for development of failure prediction aid tools.
- Machine learning technology and monitoring of the drift from the nominal operating state of a machine.
- Multi-measurements mode remotely set-up (periodic or wake-up feature)
- Non-intrusive technology: works on battery power, no connection is required, with autonomous and secure data transfer.
- Storage in a dedicated and secured cloud.
- Visualisation of the analysed data and processing in real time on a customisable interface.
- Remote configurable alerts and notifications for quick adjustment and response in the event of an anomaly detection.

#### Conclusion:

- Thanks to its multi-sensor platform, our beacons offer a lasting investment, as all of the key parameters that we record on the server are accessible through a REST API for future developments in data processing (predictive algorithms).
- Cumulated data can be enriched in the future by more complex detailed analysis of failure modes.

#### Additional technical and commercial documentations:

- Asystem Brochure (version V9 Eng): <http://bit.ly/2VtLfv3>
- Detailed Presentation Asystem (version V3.2.3): <https://bit.ly/3ipijLS>
- Link to Asystem short video: [https://youtu.be/72Kw\\_w3VRcc](https://youtu.be/72Kw_w3VRcc)