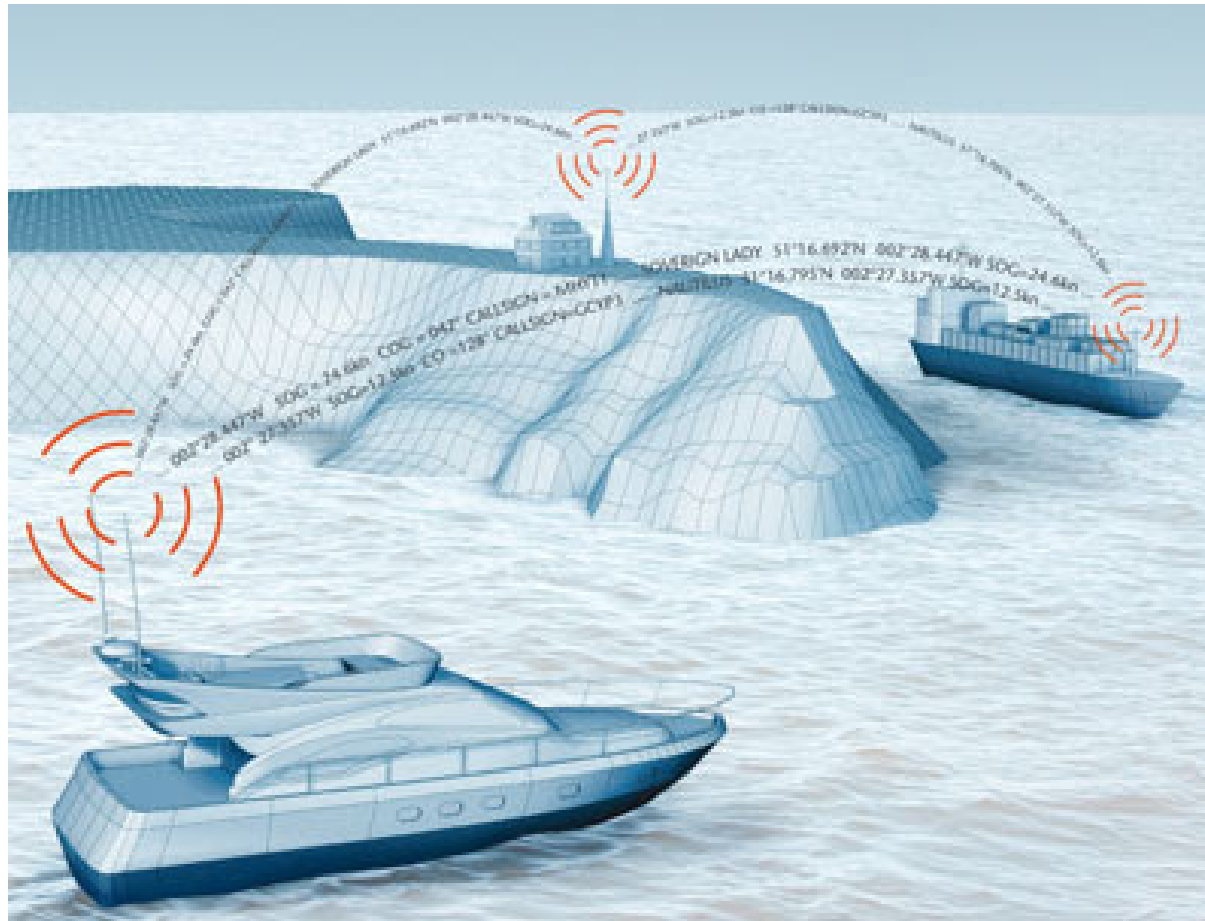


# from AIS to IOT



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# What is IoT ?



IoT ( Internet of Things ) is the internetworking of physical devices, vehicles, buildings, and other items – embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.

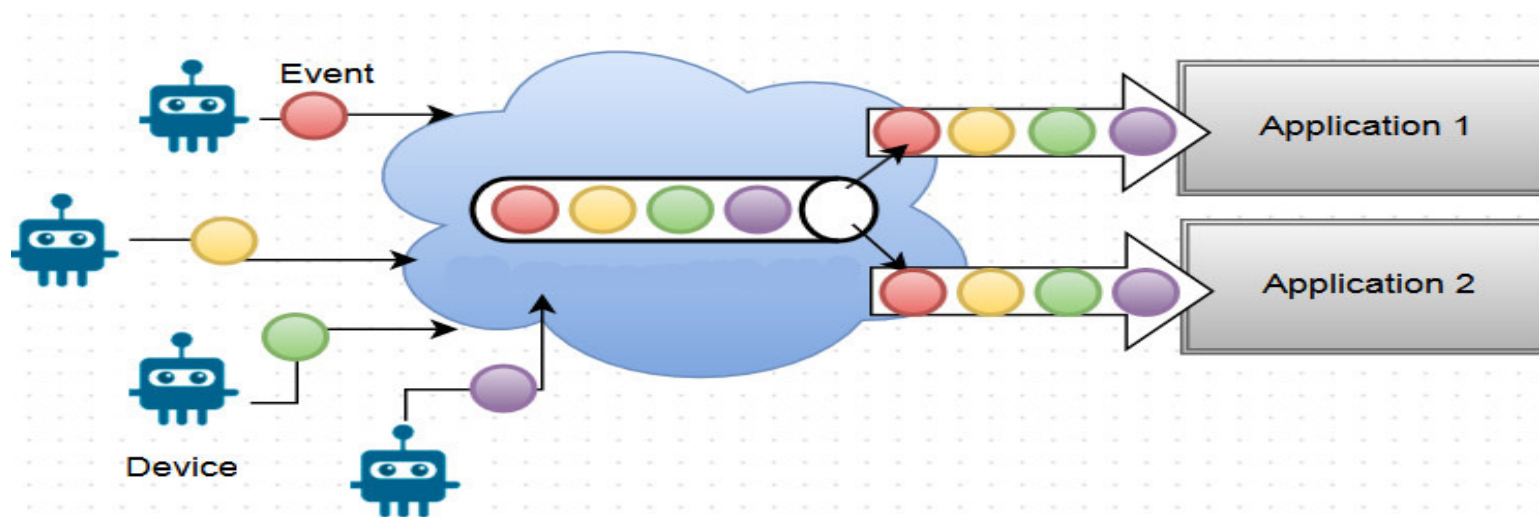
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# Why is IoT relevant to Marine Aids ?



- Economies of scale allows cheaper and diverse hardware availability.
- It gives access to a new family of telecommunication protocols for creating LPWANs ( Low Power Wide Area Network ).
- It gives access to management platforms with open API's ( Application Programming Interfaces ).









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# Hardware : Almost every available chip can run LPWANs

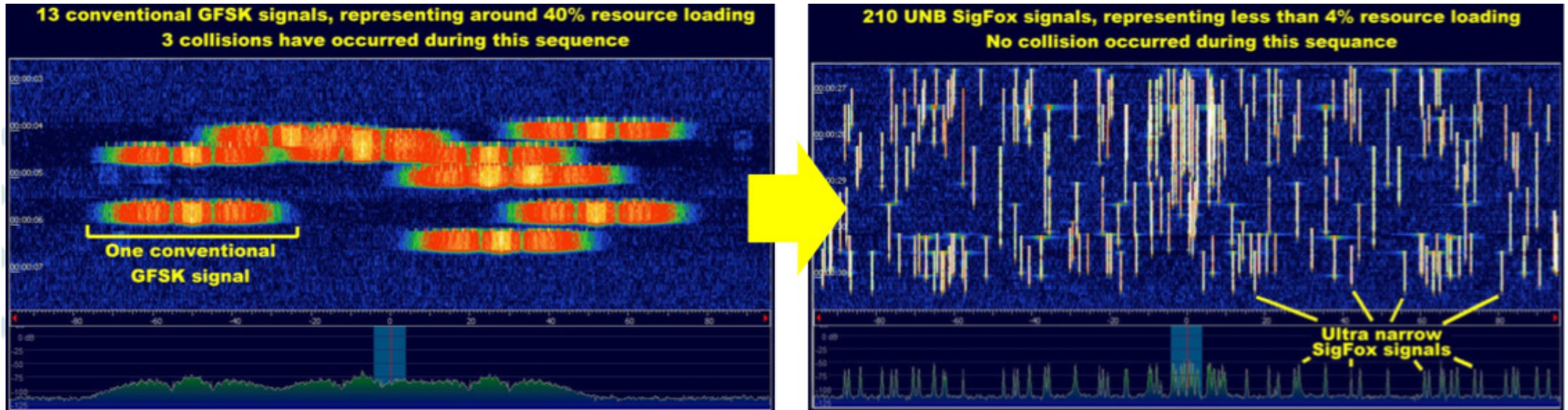
COMPANY NAME	PRODUCT NAME	DESCRIPTION
 <b>TEXAS INSTRUMENTS</b>	 CC112x family	<ul style="list-style-type: none"> <li>High performance single chip radio transceiver designed for low-power and low-voltage operation in cost-effective wireless systems</li> </ul>
 <b>SILICON LABS</b>	 SI446X	<ul style="list-style-type: none"> <li>High-performance, low-current transceivers covering the sub-GHz frequency bands from 119 to 1050 MHz</li> </ul>
 <b>AXSEM</b>	 AX 8052F143	<ul style="list-style-type: none"> <li>Transceiver integrating the micro-controller into the same component, dedicated to high volume projects where every cents matters</li> </ul>
 <b>Atmel</b>	 ATA 8520	<ul style="list-style-type: none"> <li>System-on-Chip integrating MCU, hardware security and SIGFOX wireless connectivity solutions into one package</li> </ul>

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# LPWAN example : The SigFox network

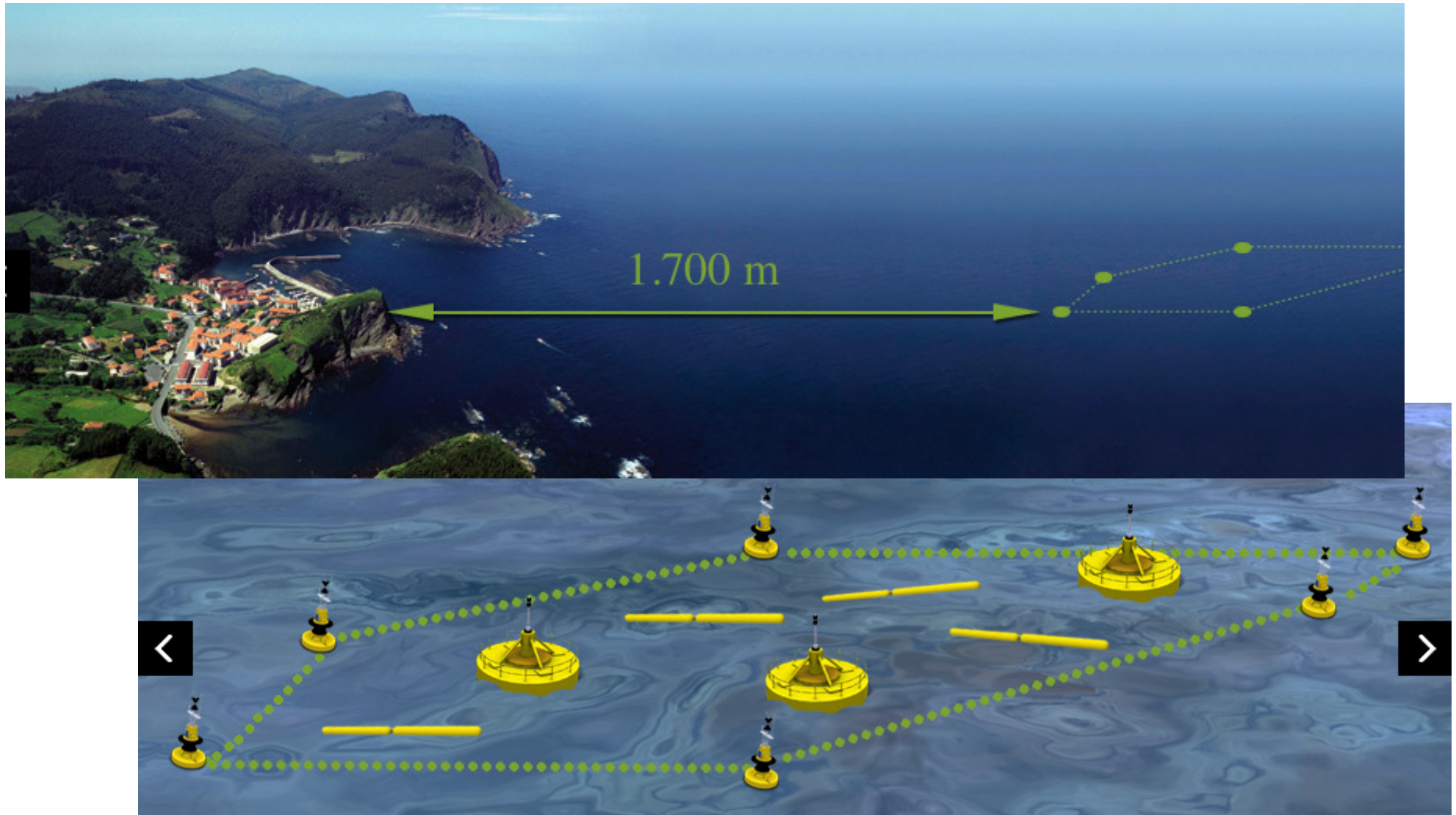


- Uses unlicensed transmission bands ( 915 MHz in US and 868 MHz in EU ).
- Ultranarrow-band technology : sends very small amounts of data ( 12 bytes ) very slowly ( 300 bauds ).
- Uses BPSK ( binary phase-shift keying ) as transmission protocol.

# SigFox versus other technologies used in marine aids

	<b>AIS</b>	<b>GSM/GPRS</b>	<b>SigFox</b>
Range	HIGH	LOW	HIGH
Device power autonomy	LOW	MEDIUM	HIGH
Cibersecurity	LOW (deception & disruption)	LOW (interception & interference)	HIGH
Available as public network	YES	YES (limited coverage in the sea)	YES (limited country coverage)
International roaming	YES	YES (at high cost)	YES (where network available)
Message cost	Null	Medium/High	LOW
End-point hardware cost	MEDIUM	VERY LOW	LOW
Base Station cost	LOW	HIGH	MEDIUM

# A real case of SigFox use in marine and wave energy experimentation site



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# A real case of SigFox use in marine and bimep wave energy experimentation site

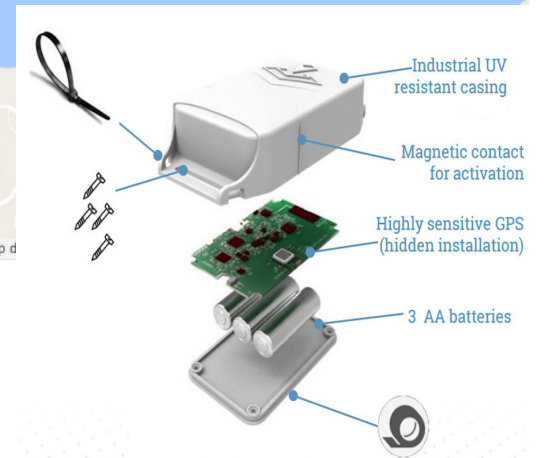
The dashboard displays 15 assets. The first six are 'Asset tracker' models (GARPDT, A61XFQ, FVRJWW, QN2CC6, JT3VMV) with status 'Ready for use'. The seventh is 'Boya BIMEP7' with status 'Online' and last activity/location updates 2 minutes ago. The map shows the BIMEP7 site with several 'BI-3151' asset markers and a '3' notification bubble.

Asset Name	Last activity	Last location update	Status
Asset tracker GARPDT	N/A	N/A	Ready for use
Asset tracker A61XFQ	N/A	N/A	Ready for use
Asset tracker FVRJWW	N/A	N/A	Ready for use
Asset tracker QN2CC6	N/A	N/A	Ready for use
Boya BIMEP7	2 minutes ago	2 minutes ago	Online
Asset tracker JT3VMV	N/A	N/A	Ready for use

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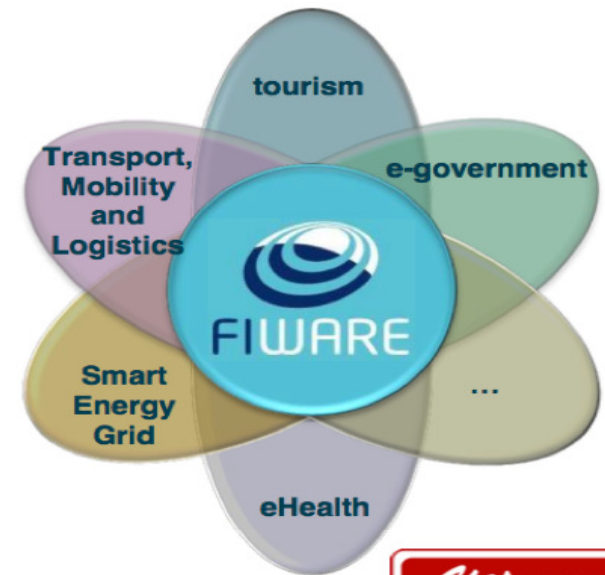




# IoT Management Platform example : FiWare

## FIWARE Mission

- Goal: capture opportunities derived from the new wave of digitalization of life and businesses that is coming
- Strategy: Build a sustainable innovation ecosystem around open standards supporting development of smart applications in multiple sectors
- Pillars:
  -  **FIWARE** : a generic, open standard platform which serve the needs of developers in multiple domains
  -  **FIWARE Lab** : a meeting point where innovation happens and data providers plus entrepreneurs can be engaged
  -  **Accelerate** : a program that funds developers and entrepreneurs, and ignites roll-out of the ecosystem
  -  **FIWARE Mundus** : reach a global footprint, opening to regions that share the same vision and ambition
  -  **FIWARE iHubs** : provide local support to the community

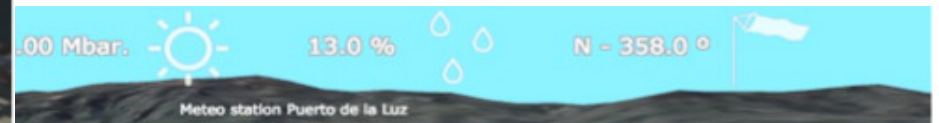


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# A real case of application: Puerto de la Luz ( Canary Islands )



2001 - Meteo station of Puerto de la Luz

Temperature:	17.6 °C
Relative humidity:	13.0 %
Pressure:	1028.00 Mbar.
Average wind speed:	5.0 km/h
Average wind direction:	N - 358.0 °



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# Conclusions

- Historically marine aids has pioneered digitalisation but there were few available technologies that suited its needs
- IoT means that digitalisation is going mainstream in all the sectors ( industry, smart-cities, transport, security, etc...)
- Marine aids specific developments will converge to IoT for economical efficiencies and for management convenience

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Email us at [info@msicom.net](mailto:info@msicom.net)



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