IK4-IKERLAN technological contribution to LSP

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## Overview slide

<table>
<thead>
<tr>
<th>Supply side or demand side</th>
<th><strong>Supply side</strong>&lt;br&gt;(we can also contribute with demand side partners)</th>
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<tbody>
<tr>
<td>IoT Large Scale Pilot (LSP) addressed</td>
<td>Generic&lt;br&gt;(with special focus on LSP-2 and 3).</td>
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</table>
| Which part of the LSP is addressed? | Safety & security *(embedded systems)*.  
*Critical infrastructure/scenarios monitoring and closed-loop control.* |
| Description of technology or solution offered / requested | (see next slides) |
| Description of the proposed approach and contribution to the LSP | (see next slides). |
| Partners already involved (supply side / demand side) | TBD |
| Partners needed (supply side / demand side) | TBD |
| Estimated budget for LSP | TBD |
| Expected duration of the LSP | TBD |
Private not-for-profit applied research centre

Facts (2014)
- Funding is mostly private (65%) and public (35%).
- Staff: 260 researchers (43 staff in training).

Member of IK4 Research Alliance (102,3 M€)
- More than 1300 researchers (> 25% PhDs).

Created in 1974 within Mondragon-Corporation
- 16.000 M€ (Spanish 7th largest industrial group).
- Workforce around 85.000 employees (cooperative).
- www.mondragon-corporation.com

Research on product conception & development
- Close to companies (not only to those in Mondragon).
- We can provide use cases and Industrial partners.
- **IoT reference platforms**: HW reference designs.
- **IoT protocols**: DDS, OPC-UA, RESTful, CoAP, MQTT
- **Safety**: for the safe and reliable operation of IoT connected devices
- **Security in embedded systems**: 
  - Authentication & privacy.
  - Anti-cloning, anti-tampering.
- **QoS in IoT architectures**: low latency, dependability, determinism
- **Wireless communications in harsh environments**: 
  - Industrial scenarios.
- **Dynamic reconfiguration management for reliability & availability.**
- **Development & integration of low-cost hardware, sensors and actuators.** 
  - Smart Systems Packaging and related electronic integration.
- **Contribution to standardization bodies.**
Pilot1 – Smart Living

- IoT-based technologies
- Open standard/Platforms and Interoperability.
- Expertise: National and European projects (> 150 houses and >300 end users and related stakeholders involved).
- Example: development of aggregators (rule based logic embedded that govern plethora of devices.) Powerline, Z-Wave, WiFi, Zigbee, Bluetooth, UniversAAL.

Pilot2 – Smart farming and food security

- Smart sensors (and microsensors)
  - Food chain & Smart farming.
- Sensor networks: Monitor & control.
- Smart system packaging (and miniaturization).
  - Adaptation to environment.
- Packaging and related electronic integration.

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Pilot3 – Wearables
- Interoperable IoT and IIoT.
- Sensing & Actuating: Closed-loops.
- Safety & Security.
- Provide integrated services with Big Data.

Pilot5 – Autonomous vehicles in connected environments.
- V2V and V2I.
- Safety + Security CPS.
  - Examples: design and development of ERTMS+ETCS signalling. IEC-61508 and SIL-4 industrial products.
- Dependability.
- Reliable and real-time platforms (monitoring and actuating).
- Mixed-criticality. Decision making.
- Advanced sensors.
Pilot6 – Water management for resilient cities

- Real-time interconnection of heterogeneous sensors and actuators.
- Critical infrastructures monitoring and control.
  - Smart Sensors.
  - Safety.
  - Security.
- Critical infrastructure monitoring.
- Structural reliability.
- Examples in other sectors: Monitoring and control of wind farms with IEC61400 (IEC-61850 mapping), Solutions for smart grids.
Smart Systems

Safety & Security

Connectivity with QoS & Interoperability

Business Models
Ongoing related European projects:

- **FP7-2011 MultiPARTES** (*Multicores partitioning for Trusted Embedded Systems*)
  Coordinator

- **ARTEMIS-2012 Arrowhead**

- **FP7-2013 PROXIMA** (*Probabilistic real-time control of mixed-criticality multicore and manycore systems*)

- **FP7-2013 DREAMS** (*Distributed REal-Time Architecture for Mixed Criticality Systems*)

- **FP7-2013 MONDO** (*Scalable Modelling and Model Management on the Cloud*)

- **H2020-Roll2Rail** (*New dependable rolling stock for a more sustainable, intelligent and comfortable rail transport in Europe*)

European Platforms: