CELTIC Proposers Brokerage Day

- Business Impact Session -

CELTIC-NEXT

Eureka Cluster

www.celticnext.eu

Business Impact of CELTIC Projects

Moderator:

Dr. David Castellas-Rufas, CELTIC GOE Member - Tenure Trac Professor at UAB

Pannelists:

fiQare: Prof. Enrique Alba, University of Málaga together with Manuel Giménez Medina, Chief Innovation Officer / R&D, Ayesa, Spain

UNICRINF & IMMINENCE: Victor Pascual Avila, Head of Security and Standards - CNS ET Standards Network Architecture Nokia, Spain

CISSAN: Alberto Doval Iglesias, CTO, Councilbox, Spain

F4itech: Ismail Uzun, Inosense, Türkiye

Business Impact of CELTIC Project:

fiQare
trust to grow

CELTIC Proposers Day

in Barcelona on 24.02.25

- Business Impact Session -

CELTIC-Project: UNICRINF

CELTIC-NEXT

Eureka Cluster

UNICRINF

Universal Critical Infrastructures

Victor Pascual Avila, Head of Security and Standards - CNS
ET Standards Network Architecture Nokia, Spain

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UNICRINF

Universal Critical Infrastructures

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Eureka Cluster

PROJECT OVERVIEW

- Celtic call: Call 2017/3
- Celtic label obtained: Yes
- Coordinator: NOKIA Spain (NOK)
- Start date of Project: (month/year): October/2018
- Kick off date: 19/12/2018
- Scheduled duration: 30 months
- Project Budget: 2,42M€
- Consortium: 4 partners from 2 countries, 2 research centers
  - Industry & Telco (Indra-Minsait, Nokia, Hispasat)
  - Research Centers & Academia (University of La Laguna, Tenerife & Juan Carlos I University, Madrid)
  - SMEs (Ubiwhere)

UNICRINF

Universal Critical Infrastructures

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MAIN FOCUS

Integrate the best of our technological companies **to improve the emergency protocols** including TV emergency Support or **messaging alarms in small, medium and large areas** as well as to investigate the technology that allows supervising the communications infrastructure in emergency scenarios

UNICRINF

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Eureka Cluster

MAIN FOCUS

Video

https://youtu.be/b2wFQ6eB6Zo

UNICRINF

Universal Critical Infrastructures

ACHIEVEMENTS

CELTIC-NEXT

Eureka Cluster

We have developed the technology to Monitor the communications infrastructure in emergency scenarios

- Design of technology to detect anomalies associated with emergency
- Specification of functionalities to supervise the network and services
- Generation of network and service status measurements in real time

Main achievements

- Full development of UNICRINF prototype
- Validation of UNICRINF with REAL emergency services

Industrialization of the technology

- New module for Indra's portfolio for Fault Management
- Nokia: Integrated geo-localized system for emergencies
- Hispasat: Integrated UNICRINF sensors with satellite

UNICRINF

Universal Critical Infrastructures

ACHIEVEMENTS

CELTIC-NEXT

Eureka Cluster

We have developed the technology to Monitor the communications infrastructure in emergency scenarios

- Design of technology to detect anomalies associated with emergency
- Specification of functionalities to supervise the network and services
- Development of Smart Event Processor (SEP) for MEC
  - Process and aggregate large amounts of data generated by sensors and probes
  - Generate/trigger complex events, based on a Complex Event Processor Engine, based on predefined sets of rules - data correlation

Main achievements

- Full development of SEP prototype
- Integration of SEP with remaining modules of the project

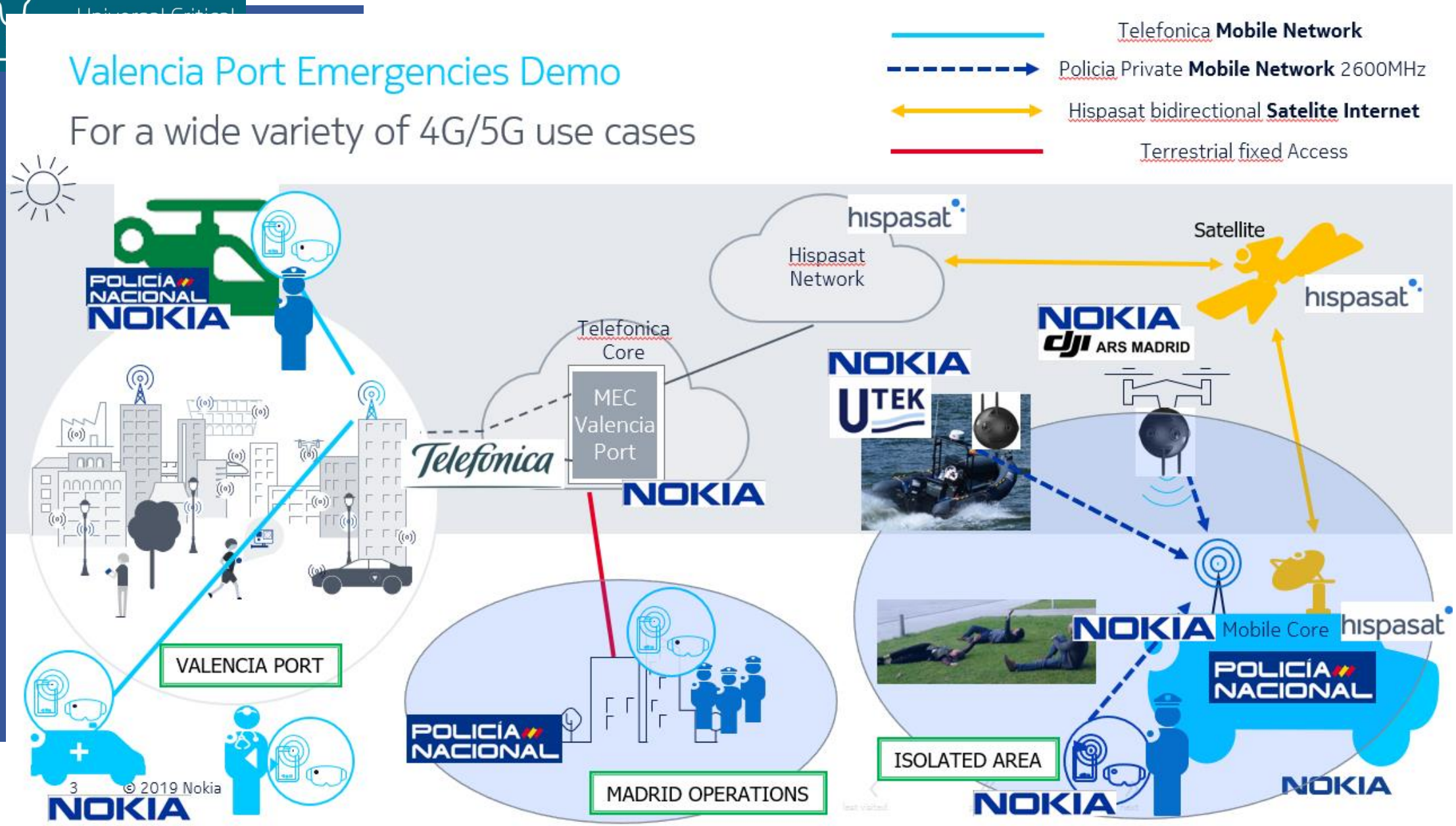
Industrialization of the technology

- Ubiwhere: Integrated SEP providing geo-localized system for emergencies

SCENARIOS

Valencia Port Emergencies Demo

For a wide variety of 4G/5G use cases



UNICRINF

Universal Critical Infrastructures

DISSEMINATION

CELTIC-NEXT

Eureka Cluster

Scientific Publications: Master Theses

- Aplicación Móvil para Optimizar el Transporte por Carretera. Jonay Zebensui Herrera Santana. Advisors: Pino Caballero Gil, Jezabel Molina Gil. University of La Laguna. 24 Sept 2019
- Sistema inteligente seguro para vehículos. Noe Campos Delgado. Advisors: Pino Caballero Gil, Jonay Suárez Armas University of La Laguna. 24 Sept 2019
- Sistema de control de acceso seguro. Jairo Gonzalez Lemus. Advisors: Pino Caballero Gil, Alexandra Rivero García University of La Laguna. 24 Sept 2019
- Técnicas para mejorar la seguridad de una aplicación web. Juan Jesús Padrón Hernández. Advisors: Pino Caballero Gil , Carlos Rosa Remedios. University of La Laguna. 20 June 2019
- Bus Guide Application Ana Beatriz Gil González. Advisors: Pino Caballero Gil, José Ángel Concepción Sánchez. University of La Laguna. 20 June 2019
- Aplicación de Blockchain a situaciones de emergencias. Sergio Ferrera De Diego. Advisors: Pino Caballero Gil, Iván Santos González. University of La Laguna. 20 June 2019

Scientific Publications: Master Theses

- Beacon-Based Fuzzy Indoor Tracking at Airports. Josué Toledo-Castro, Pino Caballero-Gil, Nayra Rodríguez-Pérez, Iván Santos-González, Candelaria Hernández-Goya. UCAmI 1255 (2018)
- Monitoring Environmental Conditions in Airports with Wireless Sensor Networks. Nayra Rodríguez Pérez, Pino Caballero-Gil, Josué Toledo-Castro, Iván Santos-González. UCAmI 1260 (2018)
- Priority and collision avoidance system for traffic lights. Iván Santos-González, Pino Caballero-Gil, Alexandra Rivero-García, Cándido Caballero-Gil. Ad Hoc Networks 94 (2019)
- Secure ambient intelligence prototype for airports. Nayra Rodríguez-Pérez, Josué Toledo-Castro, Pino Caballero-Gil, Iván Santos-González, Candelaria Hernández-Goya. Journal of Ambient Intelligence and Humanized Computing (2020)
- Detection of forest fires outbreaks by dynamic fuzzy logic controller.J Toledo-Castro, N Rodríguez-Pérez, P Caballero-Gil, I Santos-González. Logic Journal of the IGPL (2020)
- Decision Support System Based on Indoor Location for Personnel Management. Néstor Álvarez-Díaz and Pino Caballero-Gil. Remote Sensing, 13(2), 248; https://doi.org/10.3390/rs13020248 (2021)
- Building an ethereum-based decentralized vehicle rental system. García-Moreno, N., Caballero-Gil, P., Caballero-Gil, C., Molina-Gil, J. Advances in Intelligent Systems and Computing. Springer (2021)

Scientific Publications: PhD Theses

- PhD theses: Protocolos para la protección de las personas y de la información. Moisés Lodeiro Santiago. Advisors: Pino Caballero Gil, Cándido Caballero Gil. University of La Laguna. 11 October 201
- PhD theses: Protocolos para la Seguridad de la Información en e-Health. Alexandra Rivero García. Advisors: Candelaria Hernández Goya, Pino Caballero Gil. University of La Laguna. 15 October 2020
- PhD theses: Aplicaciones Tecnológicas para Proteger la Seguridad Física de las Personas. Iván Santos González. Advisors: Pino Caballero Gil, Jezabel Molina Gil. University of La Laguna. 15 October 2020

UNICRINF

Universal Critical

IMPACT TABLE

CELTIC-NEXT

Eureka Cluster

Type of Impact	Number	Short Description
Number of new products that have been developed based on the project results.	3	Nokia Geolocalization sensors tool, Nokia Video Supervision, Minsite Supervision Unit
Number of products that have been improved using the result of the project.	2	Geolocalization Unit from Nokia, SIRDEE emergencies Tool
Expected return of investment (RoI) within the next 3 years; (please give statement related to the cost of the project: 0, 1x, 10x, 100x, 1000x etc.).	5	5x
Number of new companies that were created commercializing project results.	0	
Number of new permanent employees hired or expected to be hired by the partner organisations or spin-of companies due to activities generated by project results.	7	7 in Nokia
Cross domain cooperation (example: Telecom-Power or Telecom-civil engineering, Health)	3	Telecom-SmartCity-SecurityServices
Patents, trademarks, registered design, etc.	0	0
Prototypes / Field Trials	6	5: Malaga, Valencia, Segovia, Santiago de Compotela, Madrid
Number of contributions to standards based on results of the project.	0	
Standard implementations / Workability trials of new standards.	2	5G Rel15, RTSP
Numbers of Journal publications.	5	Detection of Forest Fires Outbreaks by Dynamic Fuzzy Logic Controller. Oxford Univ Press. 2020. Secure Ambient Intelligence Prototype for Airports. Journal of Ambient Intelligence and Humanized Computing. Springer. 2020. Secure lightweight password authenticated key exchange for heterogeneous wireless sensor networks. Elsevier. Volume 88, February 2020 Using blockchain in the follow-up of emergencies situations related to events. Alexandra Rivero-García, Iván Santos-González, Candelaria Hernández-Goya, Pino Caballero-Gil. Software: Practice and Experience. Wiley. 2019. Priority and collision avoidance system for traffic lights. Ad Hoc Networks, Elsevier. 2019.
Number of Conference papers.	1	Conferences contributions: 5G Forum 2020. UNICRINF site, including poster. https://www.5gforum.es/en/nokia-presents-in-the-virtual-5gforum-new-ways-to-connect-with-others/
Number of PhD thesis contributing to and using project results.	3	PhD theses: Protocolos para la protección de las personas y de la información. Moisés Lodeiro Santiago. Advisors: Pino Caballero Gil, Cándido Caballero Gil. University of La Laguna. 11 October 201 PhD theses: Protocolos para la Seguridad de la Información en e-Health. Alexandra Rivero García. Advisors: Candelaria Hernández Goya, Pino Caballero Gil. University of La Laguna. 15 October 2020 PhD theses: Aplicaciones Tecnológicas para Proteger la Seguridad Física de las Personas. Iván Santos González. Advisors: Pino Caballero Gil, Jezabel Molina Gil. University of La Laguna. 15 October 2020

UNICRINF

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CELTIC-NEXT
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Number of Master thesis contributing to and using project results.	13	Aplicación Móvil para Optimizar el Transporte por Carretera. Jonay Zebensui Herrera Santana. Advisors: Pino Caballero Gil, Jezabel Molina Gil. University of La Laguna. 24 Sept 2019. Beacon-Based Fuzzy Indoor Tracking at Airports. Josué Toledo-Castro, Pino Caballero-Gil, Nayra Rodríguez-Pérez, Iván Santos-González, Candelaria Hernández-Goya. UCAmI 1255 (2018) Monitoring Environmental Conditions in Airports with Wireless Sensor Networks. Nayra Rodríguez Pérez, Pino Caballero-Gil, Josué Toledo-Castro, Iván Santos-González. UCAmI 1260 (2018) Priority and collision avoidance system for traffic lights. Iván Santos-González, Pino Caballero-Gil, Alexandra Rivero-García, Cándido Caballero-Gil. Ad Hoc Networks 94 (2019) Secure ambient intelligence prototype for airports. Nayra Rodríguez-Pérez, Josué Toledo-Castro, Pino Caballero-Gil, Iván Santos-González, Candelaria Hernández-Goya. Journal of Ambient Intelligence and Humanized Computing (2020) Detection of forest fires outbreaks by dynamic fuzzy logic controller.J Toledo-Castro, N Rodríguez-Pérez, P Caballero-Gil, I Santos-González. Logic Journal of the IGPL (2020) Decision Support System Based on Indoor Location for Personnel Management. Néstor Álvarez-Díaz and Pino Caballero-Gil. Remote Sensing, 13(2), 248; https://doi.org/10.3390/rs13020248 (2021) Building an ethereum-based decentralized vehicle rental system. García-Moreno, N., Caballero-Gil, P., Caballero-Gil, C., Molina-Gil, J. Advances in Intelligent Systems and Computing. Springer (2021) Sistema inteligente seguro para vehículos. Noe Campos Delgado. Advisors: Pino Caballero Gil, Jonay Suárez Armas University of La Laguna. 24 Sept 2019 Sistema de control de acceso seguro. Jairo Gonzalez Lemus. Advisors: Pino Caballero Gil, Alexandra Rivero García University of La Laguna. 24 Sept 2019 Técnicas para mejorar la seguridad de una aplicación web. Juan Jesús Padrón Hernández. Advisors: Pino Caballero Gil , Carlos Rosa Remedios. University of La Laguna. 20 June 2019 Bus Guide Application Ana Beatriz Gil González. Advisors: Pino Caballero Gil, José Ángel Concepción Sánchez. University of La Laguna. 20 June 2019 Aplicación de Blockchain a situaciones de emergencias. Sergio Ferrera De Diego. Advisors: Pino Caballero Gil, Iván Santos González. University of La Laguna. 20 June 2019
Open source Software Users – Software developed in the project.	0	
Future prove Networks	3	5G NSA for emergencies
Techno-economics	2	
Home Network/gateway concepts	1	IoT Gateways
Web – Telco convergence	0	
Other	0	

This project, has been funded in Spain by the **Centro para el Desarrollo Tecnológico Industrial** E.P.E. (CDTI) and in Portugal by **Portugal 2020**.

This is also a **Eureka Celtic Next project**. Celtic-Next strengthens the competitiveness of the European industry by fostering European R&D cooperation in telecommunications, and the well-being of the society by stimulating innovative information and telecommunication services. Celtic-Plus focuses on telecommunication and ICT connecting people and businesses in a secure way.

Universal Critical Infrastructure

CELTIC project UNICRINF

Maria Luisa Arranz
Nokia Spain

UNICRINF

Universal Critical Infrastructures

CELTIC-NEXT

Eureka Cluster

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- https://www.celticnext.eu/project-unicrinf/
- https://www.nokia.com/es_int/unicrinf/

CELTIC Proposers Day

in Barcelona on 24.02.25

- Business Impact Session -

CELTIC-Project: IMMINENCE

CELTIC-NEXT

Eureka Cluster

IMMINENCE

Victor Pascual Avila, Head of Security and Standards - CNS
ET Standards Network Architecture Nokia, Spain

www.celticnext.eu

PROJECT OVERVIEW

- Celtic call: 2020-2, 19 October 2020 (Joined Celtic – Eurogia)
- Keywords: Intelligent Management, AI Data Analytics, Autonomous Management, 5G, QoS/QoE
- Coverage of Research Objectives:
  - A10 Network Management and operation, C8 Artificial Intelligence
- Coordinator: Indra – Minsait (IND), Spain
- Start date of Project: (month/year): June/2021
- Kick off date: 23 June 2021
- Duration: 33 months
- Project Budget: 7,2M€
- Consortium: 18 partners and 3 subcontracted from 6 countries
  - Telco (Orange Labs Poland, Turkcell)
  - Industry (Indra, Nokia, Amper, Ericsson, Epiroc, Volvo Construction Equipment, Ulak)
  - Research Centers & Academia (RISE, Warsaw U., IT Aveiro, Lund U., Cantabria U.- subcontract, La Laguna U.- subcontract)
  - SMEs (Karel, Systemics-PAB, Alkit, Wavecom, BEIA, Time Critical Networks- subcontract)

MAIN FOCUS

- The main focus of IMMINENCE is to develop intelligent network management and control functions techniques for exploiting 5G use cases

- **Intelligent business analytics capabilities**: Development of a business intelligence analytic platform for exploiting 5G Use cases
- **Intelligent network management**: Implementation of management and monitoring capabilities to manage 5G UCs
- **New mechanisms for future mobile networks**: Related to the enhanced network technology to support innovative 5G UCs

ACHIEVEMENTS

Intelligent business analytics capabilities

- Development of a business intelligence analytic platform for exploiting 5G Use cases

- Detection of objects from video
- Modeling Quality of Experience (QoE)
- Exploitation of rest of use cases

Intelligent network management

- Implementation of management and monitoring capabilities to manage 5G UCs

- Industrial Communications and Smart Factories
- Remote control in Industrial environments
- E-Health Services in Rural Areas
- IoT Equipment Used For Routing

New mechanisms for future mobile networks

- Related to the enhanced network technology to support innovative 5G UCs

- Drones & UAV for future mobile networks
- Moving Vehicle Scenario: prioritization of flows
- Multi-homed vehicle: vehicles with different connectivity
- Data Collection and Cloud Processing in Connected Fleets

SCENARIOS

New mechanisms for future mobile networks

Intelligent network management

Intelligent business analytics capabilities

USE CASES

- Moving Vehicle Scenario
- Multi-homed vehicle
- Industrial communication & Smart Factories
- Remote control in Industrial environments
- Modeling Quality of Experience (QoE)
- Detection of objects from video
- Drones & UAV for future mobile networks
- Connected Vehicle Fleets
- E-Health Services in Rural Areas
- IoT Equipment Used For Routing

DISSEMINATION

Industrial Exploitation and academia

- ITU GSTR-5GQoE: QoE requirements for real-time multimedia services over 5G networks (VQEG)
- Contribution on security issues from an external-to-network point of view at (European Committee for Standard) CEN/CLC/JTC 13/WG7
- Contribution to O-RAN in the framework of standICT.eu 2026 in terms of developing evaluation tests for Open RAN
- 1 PhD theses
- 12 Master theses

Total: **3 standard + 13 theses**

Scientific Publications

- IEEE Transactions on Multimedia
- IEEE Microwave and Wireless Components Letters
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on ML in Communications and Networking
- Multimedia Tools and Applications, Springer
- Logic Journal of the IGPL. Oxford Univ Press
- Elsevier Journal of Vehicular Communications
- ACM SIGCOMM, IEEE ENERGYCON, etc.

Total: **45 publications**

Activities and events

- Inclusion of Security results realized within the project framework in the Techniki sieci mobilnych course (WUT)
- Karel's strategies about 5G and the preparations for 6G technology in a local panel
- Research conference KSTiT 2022 held in Warsaw with more than 300 participants
- Participation on the 9th FIWARE Global Summit 2023
- Dissemination within our companies: 5

Total: **14 activities and events**

IMPACT TABLE

Type of Impact	Number	Short Description
Number of **new products** that have been developed based on the project results.	**7**	Indra (5G Analytics Platform), Nokia (5G KVIs Platform), Amper (4G eNodeB +EPC and data analytics in the edge, EPC embedded in drone; 5G gNodeB and data analytics in the edge), Wavecom (5G CPE), Systemics (5G spatial analysis) and Orange (Monitoring services using drones)
Number of **products that have been improved** using the result of the project.	**11**	Nokia (3 Private 5G Networks features), Amper (IMSI Grabber), Alkit (WICE telematic system for automotive data capture, and TCN's tool for digital twin modelling), Systemics (5G analysis profolio), Ericsson 6G research roadmap, Orange (AI platform for real time objects detections from drone), Turkcell (CEI), Karel (SDN) and ULAK (SD-WAN)
Expected return of investment (**RoI**) within the next 3 years; (please give statement related to the cost of the project: 0, 1x, 10x, 100x, 1000x etc.).	**15x**	The intelligent network management, control functions techniques, as well as intelligent business analytics capabilities to exploit 5G Use Cases will be commercialised in terms of different modules of the IMMINENCE ecosystem, which expected ROI is about 15 times in next 3 years
Will your organisation be able to **reduce costs** significantly as a result of the project?	**10%**	Expected reduced operational costs related to the integration of technologies to avoid duplications (10%) and by predicting customer complaints beforehand. In addition, improvements in the analysis portfolio may reduce postprocessing time by 5%.
Number of **new permanent employees** hired or expected to be hired by the partner organisations or spin-of companies due to activities generated by project results.	**5**	Nokia (2), IT (3)
Cross domain cooperation (e.g: Telecom-Power or Telecom-civil engineering, Health)	**7**	eHealth, Factories, Mining, Energy, Automotive, Transport and Logistics
Prototypes / Field Trials	**18**	Indra (1), Nokia/ULL (2), Amper/UC (2), Ericsson/RISE/LU(1), Turkcell/Ericsson (1), Volvo CE/RISE (1), Epiroc/RISE (1), IT (1), Orange (2), Systemics (3), Turkcell (1), Karel (1), Ulak (1)
Number of **contributions to standards** based on results of the project.	**3**	Please find the list in the Self-Assessment section
Standard implementations / Workability trials of new standards.	**3**	Nokia (1), SYS(1), WUT (1)
Numbers of **Journal** publications.	**17**	Please find the list in the Self-Assessment section
Number of **Conference** papers.	**28**	Please find the list in the Self-Assessment section
Number of **PhD thesis** contributing to and using project results.	**1**	Please find the list in the Self-Assessment section
Number of **Master thesis** contributing to and using project results.	**12**	Please find the list in the Self-Assessment section
Open source Software Users – Software developed in the project.	**8**	Amper/UC (1), Ericsson (1), Orange(1), Systemics (1), Turkcell(1), Karel (1), Ukak (2)
Future prove Networks	**4**	5G SA core, 5G mmW radio, 5G evaluation methodology, Contributed to Network Automation
Techno-economics	**2**	Initial and final exploitation plan of the project
Home Network/gateway concepts	**2**	Gateway for IoT devices (2)
Web – Telco convergence	**5**	Web based GUIs (5)
Other	**14**	Other activities and events (Please find the list in the SA section)

This project, has been funded in Spain by the **Centro para el Desarrollo Tecnológico Industrial** E.P.E. (CDTI), in Sweden by **Vinnova**, in Portugal by **Portugal 2020**, in Poland by **Narodowe Centrum Badań i Rozwoju** (National Centre for Research and Development) and in Turkey by **Tübitak**.

This is also a **Eureka Celtic Next project**. Celtic-Next strengthens the competitiveness of the European industry by fostering European R&D cooperation in telecommunications, and the well-being of the society by stimulating innovative information and telecommunication services. Celtic-Plus focuses on telecommunication and ICT connecting people and businesses in a secure way.

GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES CDTI INNOVACIÓN

PORTUGAL 2020

Narodowe Centrum Badań i Rozwoju

VINNOVA Sweden's Innovation Agency

TÜBİTAK

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- http://www.imminence.eu/

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CELTIC-Project: CISSAN

CELTIC-NEXT

Eureka Cluster

CISSAN

Presenter: Alberto Doval
Councilbox (Project Member)

www.celticnext.eu

Collective intelligence supported by security aware nodes

CISSAN

Summary

CISSAN

- CISSAN is a CELTIC-NEXT project running in Austria, Finland, Spain, and Sweden
  https://www.celticnext.eu/project-cissan
  https://www.jyu.fi/en/projects/cissan
- Start date is 1 May 2023, end date is 31 May 2026
- Supported by Austrian Research Promotion Agency (FFG), Business Finland, Centre for the Development of Industrial Technology (CDTI), Swedish Agency for Innovation Systems (Vinnova)
- Coordinated by the University of Jyväskylä (FI)
- Total project budget is ~ EUR 8.5M
- Total effort is ~ 74.6 PY

"When everything is connected, everything must be protected"

CISSAN

(*) Hypponen's Law: If it's smart, it's vulnerable (blog.f-secure.com/hypponens-law-smart-vulnerable/)

- CISSAN proposes and implements algorithms and develops solutions for countering IoT security and operational threats.
- **Focus:** Collective Intelligence (CI) of IoT network nodes, techniques for distributed security and operational monitoring, event tracking, attack detection, and response in IoT networks.
- **Expected outcome:** A set of innovative algorithms, technologies, and solutions interconnected and integrated to the project Use Cases and experimental environments, evidence of value in and beyond the project Use Cases, plans and models for production use and commercial products and services.
- **CISSAN contributes to CELTIC-NEXT core themes**: security and trust for networks, powered by AI and distributed processing for handling large data volumes.

Important remarks and considerations

CISSAN

- IoT understood broadly, including Industrial Internet of Things (IIoT) and Operational Technologies (OT)
- IoT network nodes include edge devices and backend components (e.g., in cloud environments). CISSAN builds technologies suitable for resource-limited devices and networks
- CISSAN-powered networks – networks where cybersecurity is improved via CISSAN technologies and solutions, to be presented conceptually and via examples
- Providing value for its Use Cases is a key CISSAN's objective, but our ambition is to build technologies and solutions applicable much wider
- The value we aim to bring includes facilitating security compliance and governance for the owners and operators of CISSAN-powered networks

Key concepts and choices (I)

CISSAN

- CI for cybersecurity: sharing information about vulnerabilities, threats, and mitigations among different entities and collectively selecting and carrying out actions (e.g., detection and response)
  "CI will be the result of interoperation of the IoT devices, network side and cloud-based services" (*)
- Multiple faces of CI in CISSAN:
  - Locally run algorithms and models, the results of which are aggregated
  - Data and intelligence sharing, security task delegation, and collective decision-making at run-time
  - Optimal distribution of security functions across network nodes at design-time
  - Nodes collaboration for secure and verifiable IoT events logging

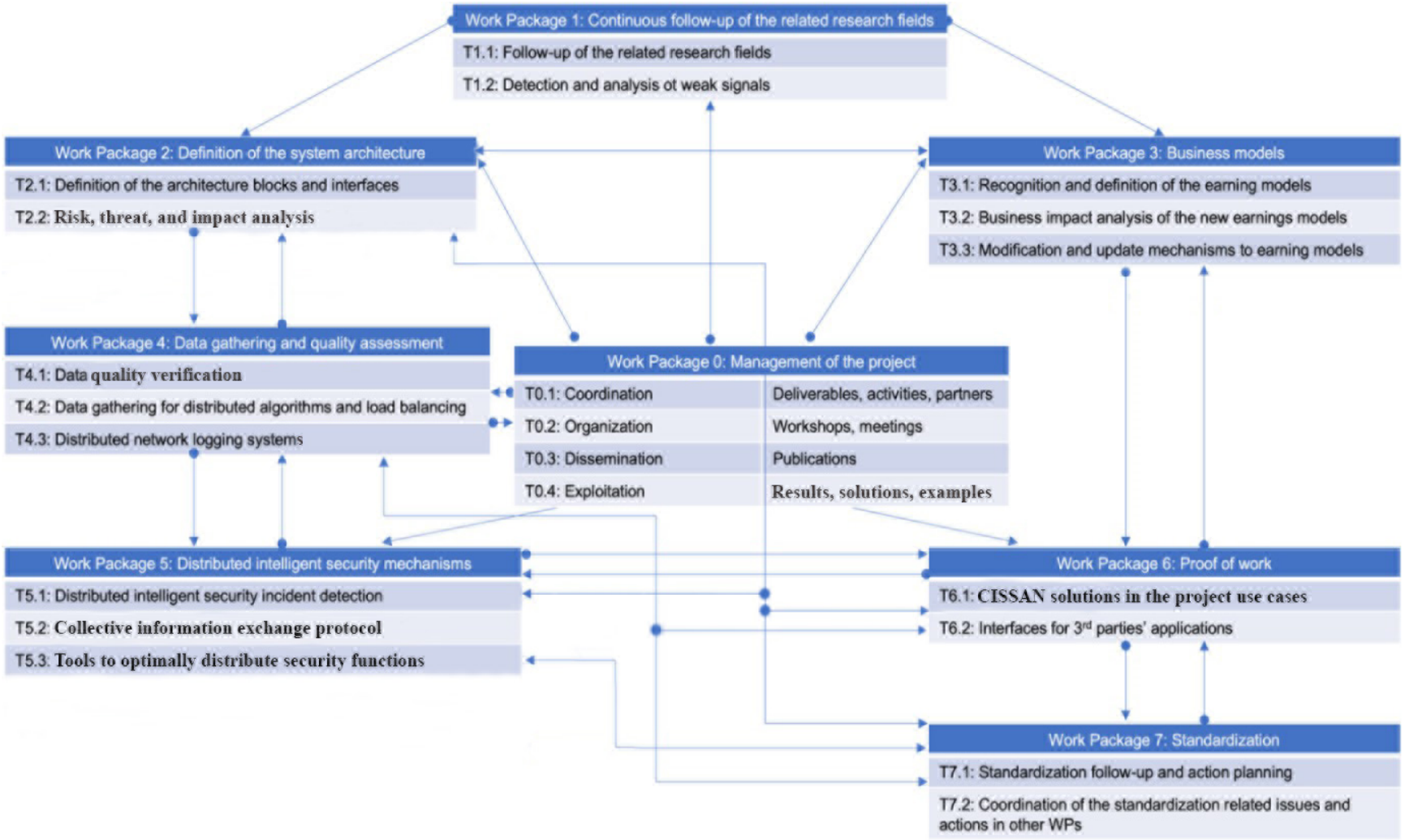
Key concepts and choices (II)

CISSAN

- AI approaches and techniques (importantly AI-based anomaly detection and generative AI) are used widely in CISSAN.
- Detection of both cyberattacks and operational threats (malfunctions, operational faults) is required in all the CISSAN Use Cases. While anomaly detection is a universal tool here, new questions arise.
- CISSAN uses generative AI to address the lack of data challenge for AI models training and validation.
- CISSAN uses blockchain-based techniques, mainly for IoT event tracking and data integrity.

Work Packages

CISSAN



Timeline

CISSAN

Work packages and tasks		GANTT Timing and milestones											
		Year 1				Year 2				Year 3			
		M1-3	M4-6	M7-9	M10-12	M13-15	M16-18	M19-21	M22-24	M25-27	M28-30	M31-33	M34-36
WP0	Management of the project												
T0.1	Coordination												
T0.2	Organisation (Project kick-off, Mid-term review, Final Review)	M0.1					M0.3						M0.5
T0.3	Dissemination												
T0.4	Exploitation (Workshops)				M0.2				M0.4				M0.6
WP1	Continuous follow-up of the related research fields												
T1.1	Follow-up of the related research fields												
T1.2	Detection and analysis of weak signals				D1.1								D1.2
WP2	Definition of the system architecture												
T2.1	Defition of the architecture blocks and interfaces			D2.1									
T2.2	Continuous risk, threat, and impact analysis				D2.2								D2.3
WP3	Business models												
T3.1	Recognition and definition of the earning models				D3.1								
T3.2	Business impact analysis of the new earnings models						D3.2						
T3.3	Modification and update mechanisms to earning models												D3.3
WP4	Data gathering and quality assessment												
T4.1	Data security				D4.1				D4.4				D4.5
T4.2	Data gathering for distributed algorithms and load balancing					D4.3							
T4.3	Distributed network logging system					D4.2							
WP5	Distributed intelligent security mechanisms												
T5.1	Distributed intelligent security incident detection									D5.2			
T5.2	Distributed detection of the AI based malicious actions							D5.1					
T5.3	Blockchain based security solutions for IoT networks										D5.3		
T5.4	AI information exchange protocol											D5.4	
T5.5	Tools to optimally distribute security subfunctions												D5.5
WP6	Proof of work												
T6.1	CISSAN platform									D6.1			D6.3
T6.2	Interfaces for 3rd parties' applications										D6.2		D6.4
WP7	Standardization												
T7.1	Standardization follow-up and action planning								D7.1				
T7.2	Coordination of the standardization related issues and actions in other WPs								D7.2				

Use Case 1:

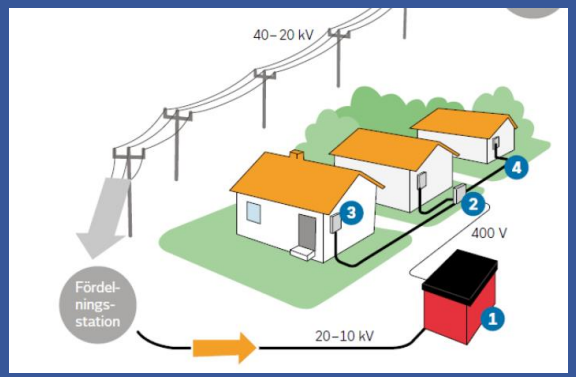
Transportation systems

CISSAN

- Represented by Mattersoft and Nodeon
- Public transport information systems with fleet monitoring, real-time passenger information, and traffic signal priorities. Transportation control systems, traffic flow analysis and traffic data management.
- In-vehicle and road-side devices. Highly centralized data processing, analysis and decision-making as of today.
- Cybersecurity of the systems is critical. NIS2 sets new requirements.
- The current focus in CISSAN is GPS data analysis – to detect jamming and spoofing attacks, malfunction of devices, other anomalies.

Use Case 2:

Smart grids



CISSAN

- Represented by Affärsverken
- Smart grid monitoring and control
- OT use case: SCADA systems, Remote Terminal Units (RTUs). Centralized security monitoring and analytics.
- Energy grids are critical infrastructures. Critical Entities Resilience (CER) Directive, NIS2.
- Current focus in CISSAN: Local and hybrid AI-based anomaly detection in network traffic and physical sensor data to identify attacks and faults. First steps in nodes collaboration at run-time.

Use Case 3:

Tunnelling and mining

CISSAN

- Represented by Geodata
- IoT systems for underground construction monitoring
- Geotechnical (physical measurement) sensors. Multiple stakeholders in monitoring systems. Data tampering and operational rules violation concerns.
- Monitoring systems and services are used by critical infrastructure operators – must comply with NIS2.
- Current focus in CISSAN: Sensor data believability analysis to identify potential attacks, faults and abuse. Data integrity protection via blockchain-based techniques and the use of security chips for sensor data signing.

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Alberto Doval
CTO & Co-Founder
alberto.doval@councilbox.com
@councilbox

CELTIC Proposers Brokerage Day

-Business Impact Session-

F4iTECH

Federated AI Platform for Industrial Technologies

CELTIC-NEXT

Eureka Cluster

Dr. İsmail Uzun
CEO @INOSENS

www.celticnext.eu

Summary

Key Info

Project Status: running

Start Date: March 2022

End Date: February 2025

Budget (total): 2232.44K€

Effort: 49.06 PY

Project-ID: C2021/1-10

Coordinator

Name: Ismail Uzun

Company: Inosens

Country: Türkiye

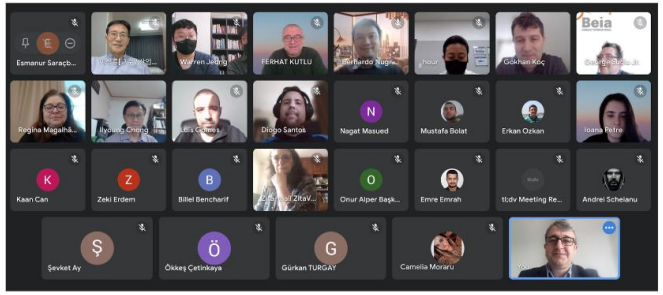
E-mail: ismail.uzun@inosens.com.tr

F4iTECH Project – Kick-off Meeting Minutes
04/03/2022

F4iTECH Summary:
Start Date: March 2022
End Date: February 2025
Budget (total): 3304.4K€
Effort: 68.1 PY
Project-ID: C2021/1-10

Attendants:
All patterns attended to the Kick-off meeting:

- Korea: DLIT, HUFS and SmartCore team
- Turkey: TORUN, KoçSistem, TAV Tech, SAMM and INOSENS team
- Portugal: Sistrade, ISEP (SIDONIOS not attended and presented by Sistrade)
- Romania: BEIA team



F4iTECH

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Consortium

Inosens, Türkiye

KocSistem, Türkiye

TAV Technologies, Türkiye

SAMM Teknology, Türkiye

TORUN, Türkiye

DLIT, South Korea

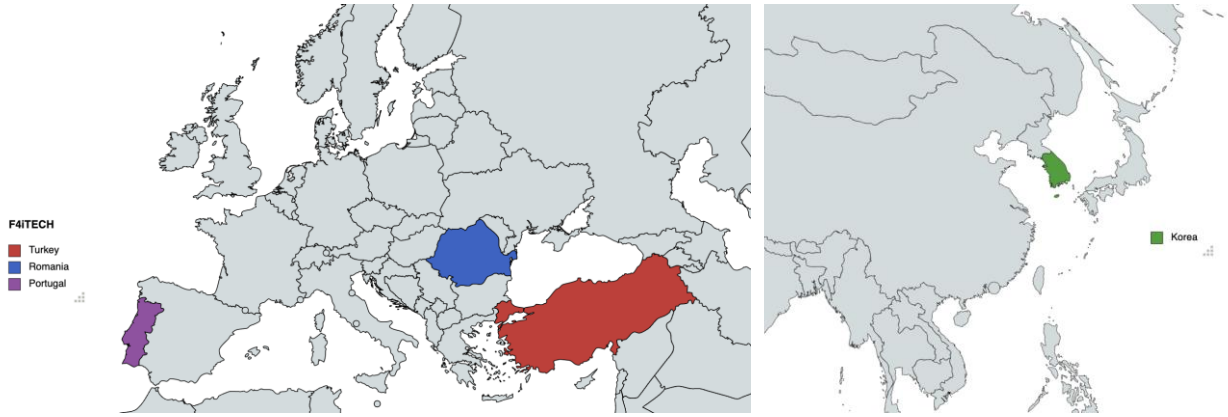
HUFS, South Korea

SmartCore, South Korea

ISEP/IPP, Portugal

Sistrade Software Consulting S.A., Portugal

SIDONIOS MALHAS S.A., Portugal



4 Countries,

12 organizations

2 Universities,
3 Industrial Partners
7 SMEs

* 1 University in Turkey is Subcontractor

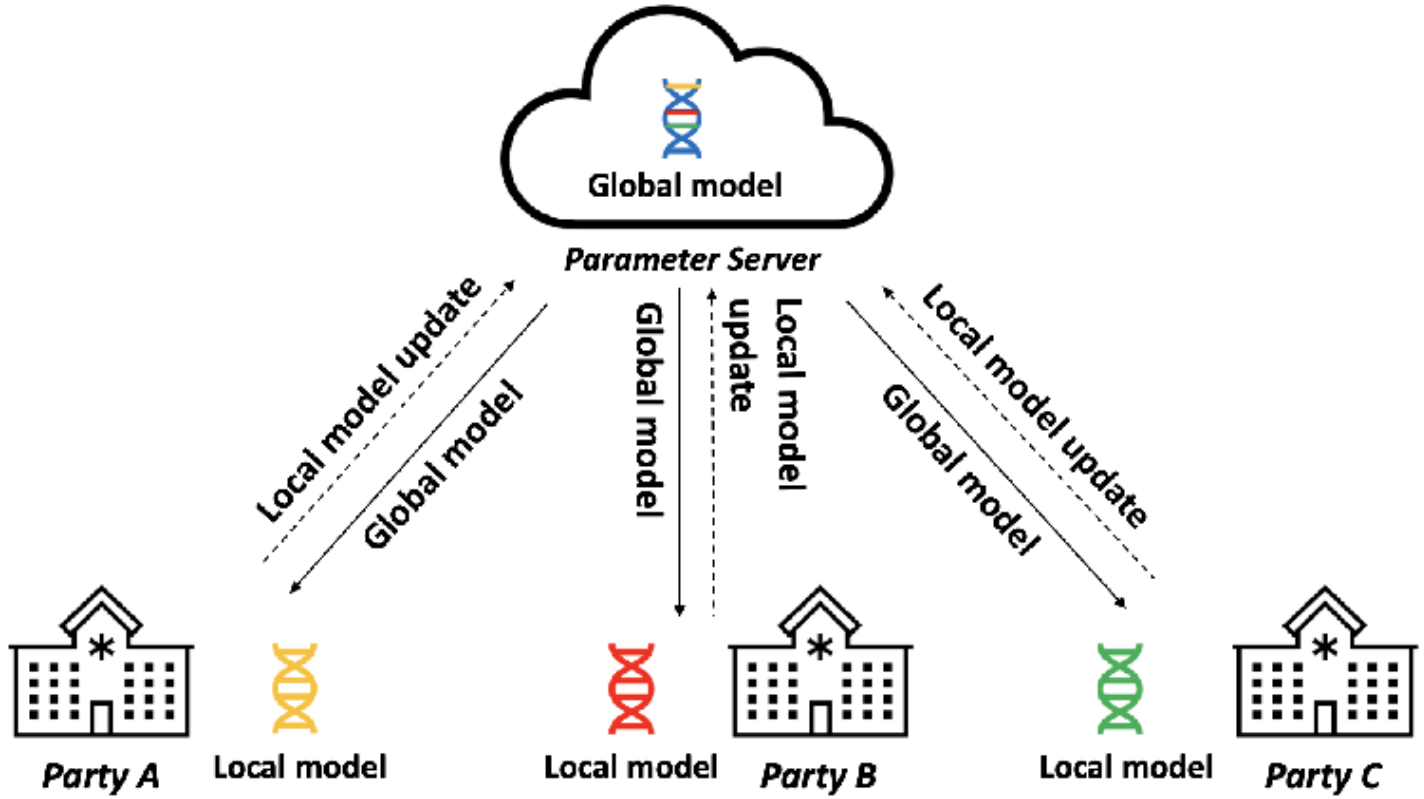
Timeline

F4iTECH		2022/I				2022/II						2023/I						2023/II						2024/I						2024/II						2025/I	
WPs		3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
WP1: Project Management		D1.1	D1.2																																		D1.3
	Task 1.1: Project Management																																				
	Task 1.2: Risk Management																																				
	Task 1.3: Dissemination and Exploitation																																				
WP2: Architecture, Requirements & Specifications							D2.1						D2.2 D2.3																								
	Task 2.1: Requirements and specifications																																				
	Task 2.2: Infrastructure architecture design																																				
	Task 2.3: Blockchain architecture design																																				
WP3: Infrastructure Development																									D3.1						D3.2 D3.3						
	Task 3.1: AI Model Management Module																																				
	Task 3.2: Blockchain Infrastructure																																				
	Task 3.3: Client Cluster Management Module																																				
	Task 3.4: Federated Learning Core Services & Components																																				
WP4: Use Cases and													D4.1																								D4.2
	Task 4.1: Business Requirement Analysis																																				
	Task 4.2: Development and Integration																																				
	Task 4.3: Demonstrations and																																				

Deliverables

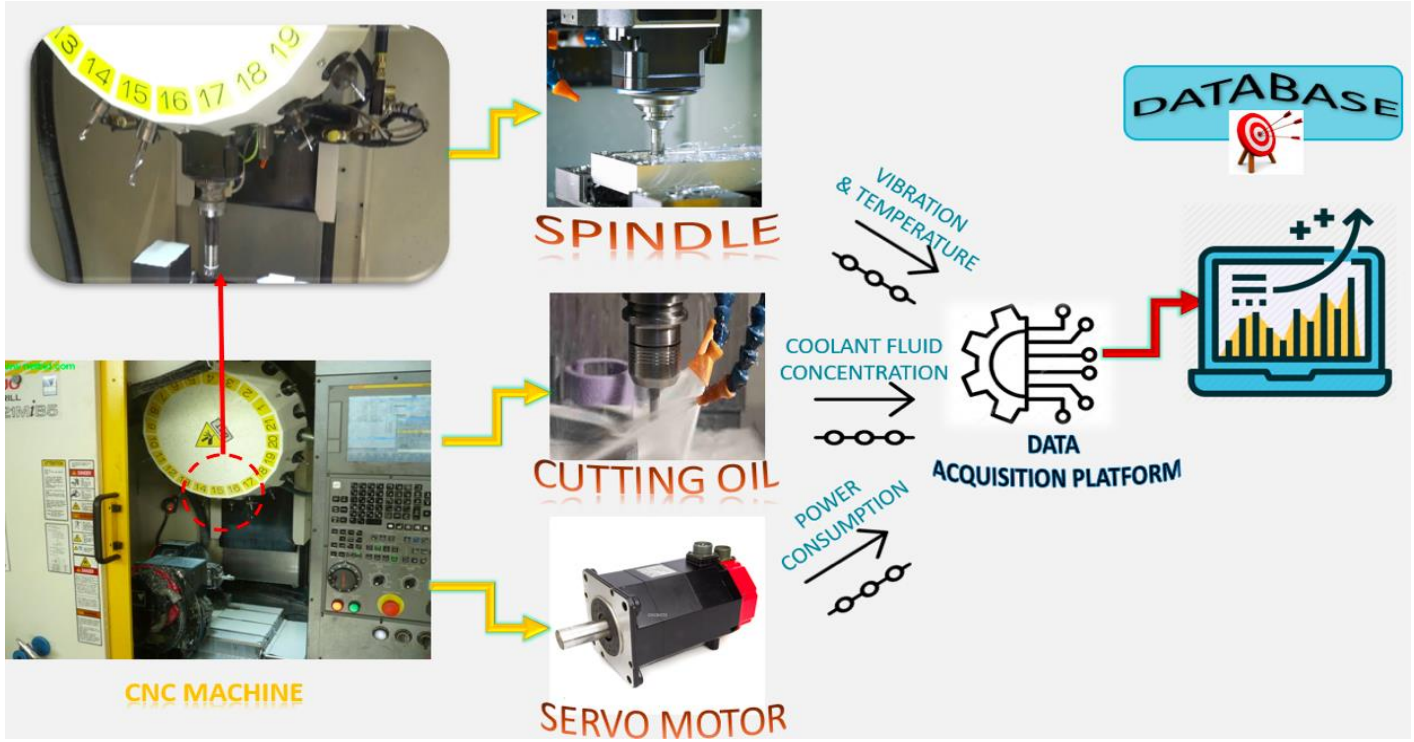
Del. No.	Name of Deliverable (Dx.x) or Milestone (Mx.x)	Type (report, software)	Dissem. level[1]	Delivery month[2]	Responsible	Reviewer 1	Reviewer 2
D1.1	Project Management Plan	Document	CO	M1	INOSENS	SAMM	TAV Tech
D1.2	Risk Management Plan	Document	CO	M2	SAMM	INOSENS	BEIA
D1.3	Analysis and performance results of airport scenario	Document	CO	M36	TAV Tech	SisTrade	INOSENS
D2.1	Requirements and specifications	Document	CO	M6	ISEP	TAV Tech	SisTrade
D2.2	Infrastructure architecture	Document	CO	M12	INOSENS	HUFS	ISEP/GTU
D2.3	Blockchain architecture	Document	CO	M12	SmartCore	KoçSistem	ISEP
M2.1	Final system architecture accepted by the consortium	Document	CO	M12			
D3.1	Federated Learning Infrastructure v1.0	Software	CO	M24	HUFS, INOSENS	KoçSistem	TAV Tech
D3.2	Federated Learning Infrastructure v2.0	Software	CO	M30	HUFS, INOSENS	KoçSistem	TAV Tech
D3.3	Blockchain Infrastructure.	Software	CO	M24	SmartCore	İNOSENS	TAV Tech
D4.1	Use Case Definition and Requirements Analysis Report document	Document	CO	M12	TAV Tech	ISEP	DLIT
D4.2	Analysis Output of Demonstrations	Document	CO	M36	INOSENS	SAMM	TORUN
M4.1	Specifications and requirements of the use cases identified and described	Document	CO	M12			

Federated Learning (FL)



FL is a decentralized machine learning technique that enables multiple parties to collaboratively train ML models while keeping their data **securely** stored on their local devices.

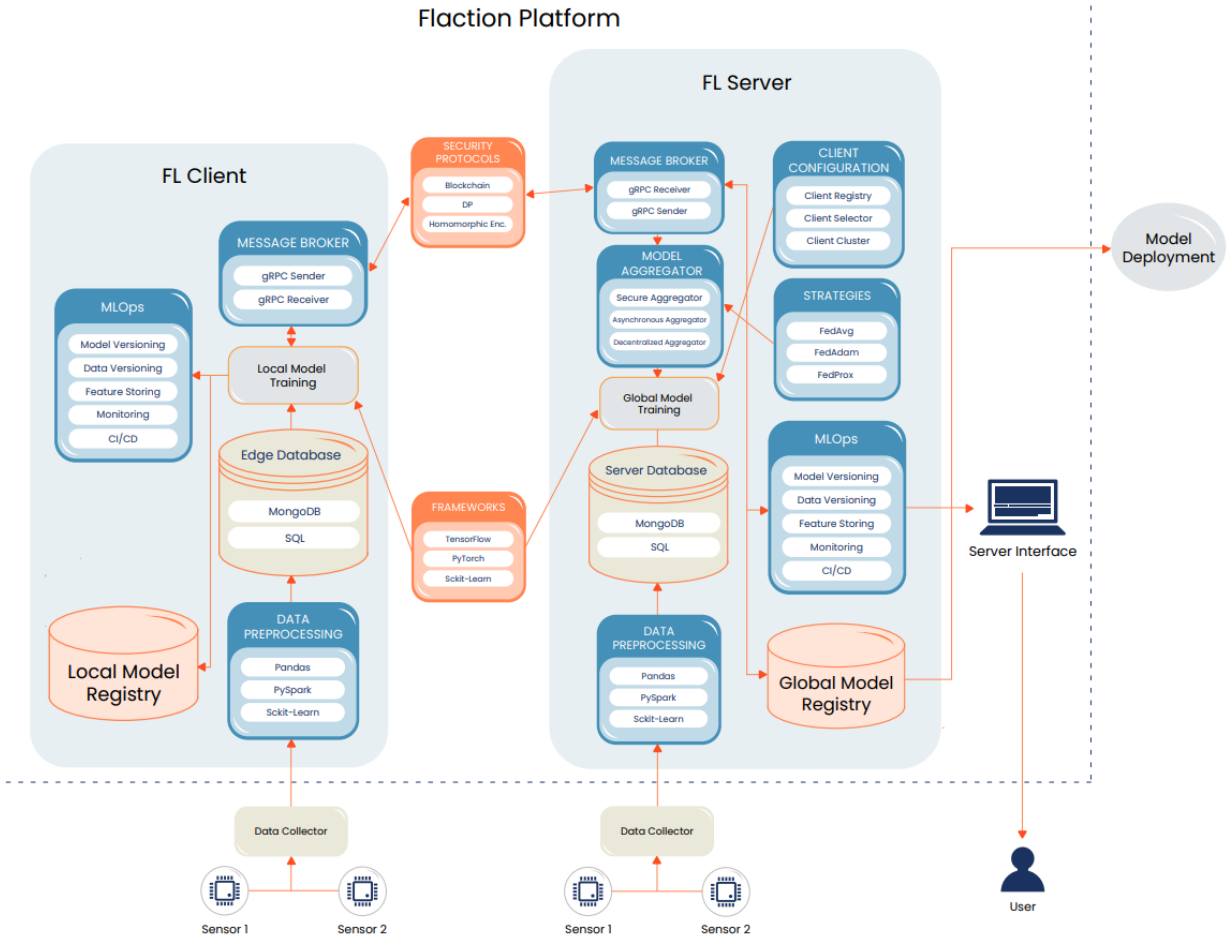
Idea of F4iTECH



Current AI-based industrial applications follow a linear, sequential approach to data collection, processing, and model deployment, often leading to centralized data collection challenges and potential quality issues.

To address this, F4iTECH aimed to develop a federated learning platform tailored for industrial automation.

FLaction



A **Federated Learning (FL)** platform for industrial automation that offers solutions by building AI models on decentralized data and may use blockchain approach to disseminate data allowing accuracy and privacy.

F4iTECH

Use Cases

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2. Smart Factories

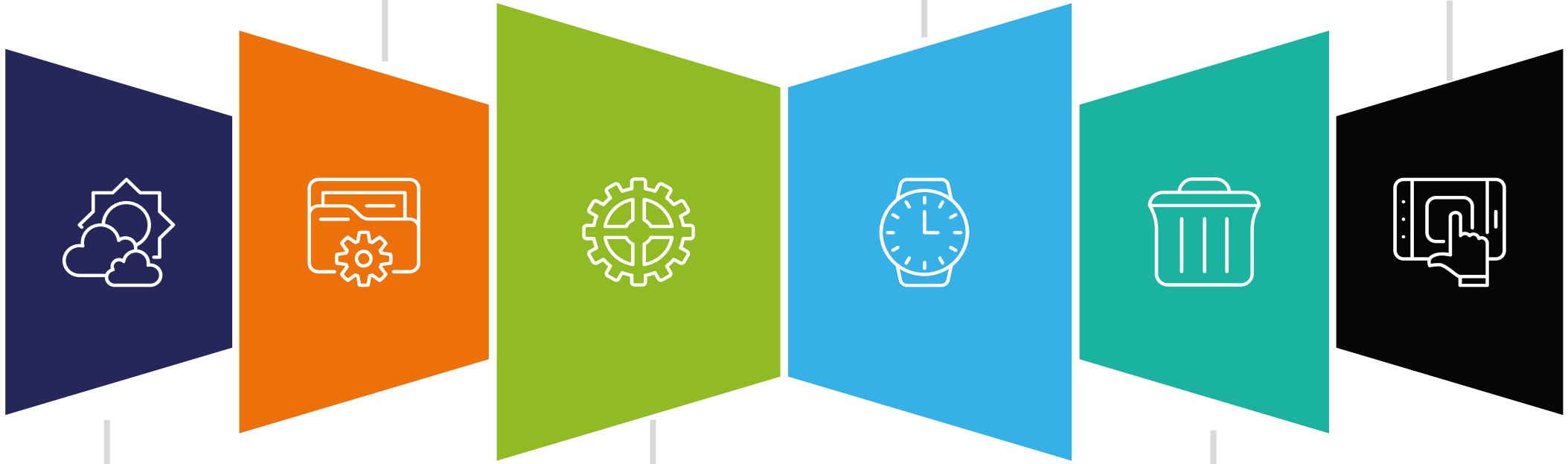
Remaining Useful Lifetime

4. Textile

Manufacturing Process

6. Supply Chain

Blockchain Based Management



1. Aviation

Airport Passenger

3. Retail

Customer Emotion

5. DAS

Anomaly Detection by Distributed Acoustics Sensing

F4iTECH

Business Impact

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1. Enhanced Data Privacy and Security
2. Cost Reduction and Efficiency Gains
3. Customization and Flexibility
4. Operational Resilience
5. Sustainability and Resource Optimization

Business Impact

6 New Products

7 Technological Leadership

8 Partnership and Strategic Collaboration

9 Understand New Markets and Cultures

10 Industry Collaboration (SME-Uni-I)

F4iTECH

Business Impact

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İNOSENS and DLIT (http://eng.dlit.co.kr/), partners in the F4iTECH project, entered into a Memorandum of Understanding (MoU) with the aim of strengthening their cooperation in the Smart Factories market across ...more

d into a
ing their
..more

On October 4th, 2023, a seminar titled "Building a Smart Industry (AI, Federated Learning and Blockchain) - A Case Study for Turkey and South Korea Collaboration" was held at GOSB Teknopark A.Ş. The event was organized by the #F4iTECH project partners, İNOSENS, DLIT (http://www.dlit.co.kr/), and smartcore. The seminar aimed to strengthen cooperation between South Korea and Turkey in the fields of AI, Federated Learning, and Blockchain. #smartfactories #ai #blockchain #SouthKorea #Türkiye

Business Impact

32	Standardization activities: Submission of 2 Contributions to International Standardization Organization (ITU–T SG 20)	January 2023	Contribution Title: Revised texts of Y.DPM-qm based on TD-GEN-0267 R1 Output text of draft Recommendation ITU-T Y.DPM-qm "Requirements and functional model to support data quality management in IoT" Q4/20 meeting (Geneva, 30 January - 10 February 2023) - for consent	Data engineers and Industrial data applications management group
33	Publication of International Standard: ITU-T Y.4603	May 2023	International Standard Title: "Requirements and functional model to support data quality management in Internet of things"	Data engineers and Industrial data applications management group
34	Standardization activities: Submission of 1 Contributions to International Standardization Organization (ITU–T SG 13)	October 2023	Contribution Title: Considerations to create data products in accordance with data ownership classification of digital assets in Web 3.0 environment	Data engineers and Industrial data applications management group

45 Dissemination activity (publication, seminar etc.)

+

Contributions to ITU-T Standards

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CELTIC-NEXT

- **Federated AI Platform for Future Industry**

Business Impact of CELTIC Projects

Moderator:

Dr. David Castellas-Rufas, CELTIC GOE Member - Tenure Trac Professor at UAB

Pannelists:

fiQare: Prof. Enrique Alba, University of Málaga together with Manuel Giménez Medina, Chief Innovation Officer / R&D, Ayesa, Spain

UNICRINF & IMMINENCE: Victor Pascual Avila, Head of Security and Standards - CNS ET Standards Network Architecture Nokia, Spain

CISSAN: Alberto Doval Iglesias, CTO, Councilbox, Spain

F4itech: Ismail Uzun, Inosense, Türkiye