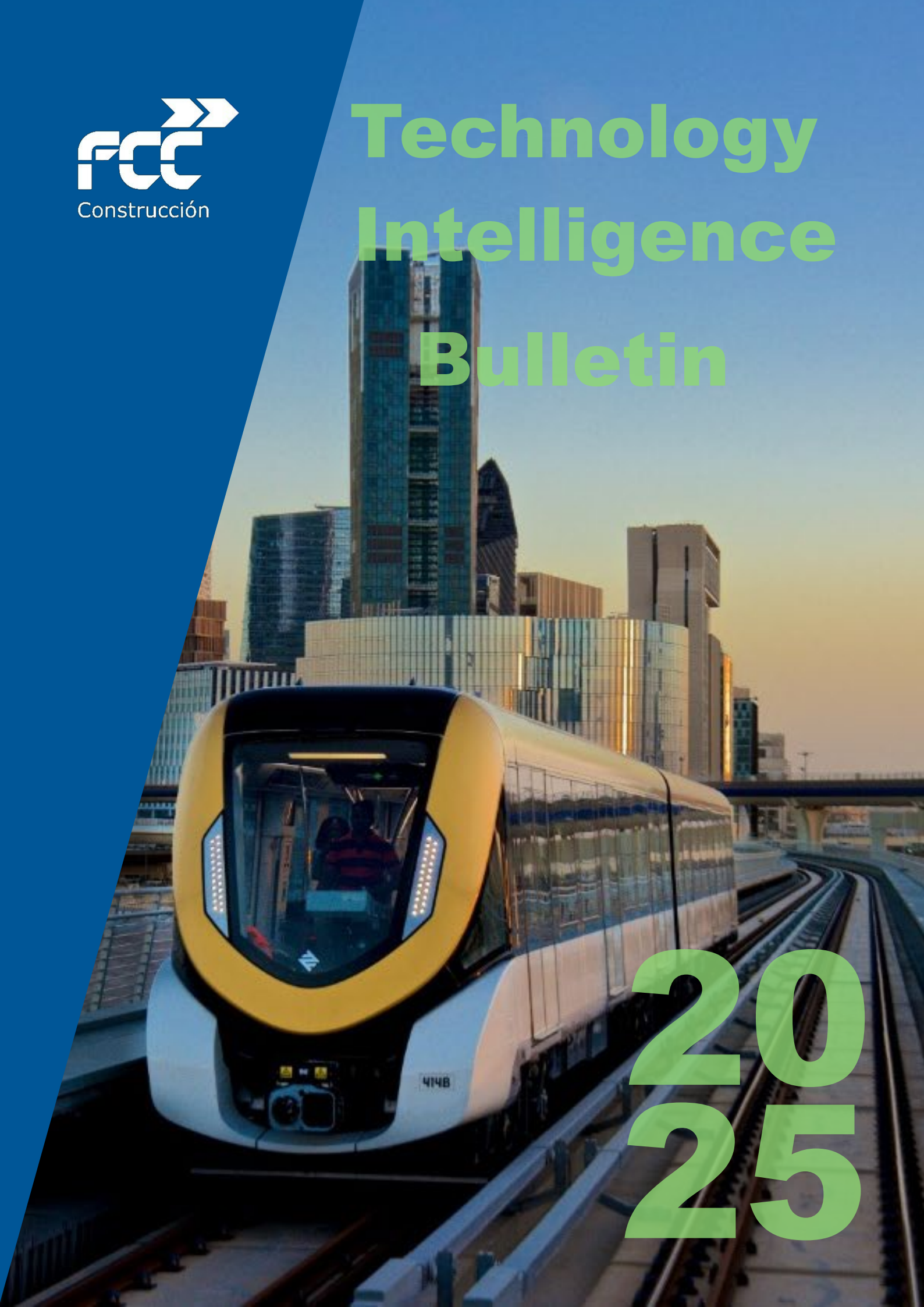
FCC Construcción

Technology Intelligence Bulletin



2025

JUSTIFICATION

Technology Watch is an activity that forms part of the R&D&I Management System (certified by AENOR in accordance with ISO 56001) and is essential for understanding the organization's environment, as well as for strategic intelligence.

The Technology Watch system is based on the following processes:

- **Annually establishing the strategic lines** on which Technology Watch will be based, supported by an analysis of the context (internal and external), the Innovation Policy, the needs and expectations of interested parties, innovation objectives, etc.
- **Identifying information sources** to address the technological needs applied to the organization's different internal processes.
- **Extracting**, through monitoring sheets, the most relevant information on technological trends, innovations, inventions, potential technology partners for innovation initiatives, and news from companies in the sector.
- **Developing the Annual Bulletin** summarizing the most relevant news.
- **Analyzing the information by the Sustainability and Innovation Management team** in order to establish action plans aligned with the latest technological advances → Innovation Strategy.

Technology Watch makes it possible to identify market opportunities through efficient information management. This process is managed by the **National R&D&I Department**, with the voluntary collaboration of the departments of **FCC Construcción** and **FCC Industrial**.

INDEX

Knowledge Management

1. Knowledge Management: paradigm shift

Date: :31/03/ 2025

General context

In sectors such as aerospace and defense, where innovation, safety, and reliability are essential, knowledge management has evolved into a strategic asset. This transformation responds both to technological complexity and to the current geopolitical situation, which demands industrial autonomy and national sovereignty.

Historical evolution

1. **Expert systems (1970s–1980s):** Early attempts to formalize technical knowledge through programmed rules. Used in fault diagnosis and maintenance planning.
2. **Knowledge-Based Engineering (KBE, 1990s):** Integration of design rules into CAD tools, systematizing technical know-how.
3. **Ontology-Based Engineering (OBE, 2000s):** Introduction of ontologies to structure and reason about technical knowledge.
4. **Model-Based Engineering (MBE, present):** Digitalization of complex systems through models that capture product, process, and system knowledge.

Paradigm shift

The approach has moved from isolated expert systems to integrated, digitalized knowledge management, where digital models become living repositories of technical knowledge. This enables:

• Reuse of accumulated knowledge.
• Sharing knowledge across teams and generations.
• Precise and continuous evolution of knowledge.

Role of generative AI

Natural language models (LLMs) such as ChatGPT are democratizing access to technical knowledge:

• Non-expert engineers can query and modify models through conversational interfaces.
• Knowledge transfer across diverse technical domains is facilitated.

Source

Source: *: La gestión del conocimiento, cambio de paradigma - Fly News*

2. The importance of document management for achieving efficient logistics

Date:09/03/ 2025

Why is document management key in logistics?
Document management has become a strategic pillar to ensure efficiency, safety, and regulatory compliance in the logistics sector. According to Martín Mora, Sales Director at a company specialized in contractor document management, administrative order and digitalization are essential to avoid legal, labor, and operational risks.

Main risks in logistics contracting
Any logistics service contracting involves risks that must be properly managed:
• **Labor:** compliance with collective bargaining agreements and working conditions.
• **Health and safety:** current protocols and regulations.
• **Legal:** mandatory documentation, licenses, insurance.
• **Brand exposure:** reputation in the event of non-compliance.
• **Union or judicial risks:** due to lack of document control.

Document management acts as a "legal and operational bodyguard," helping to prevent these issues.

Impact of technology
Digitalization has transformed logistics:
• What once required days of waiting with physical documents is now resolved in minutes using digital platforms.
• It improves traceability, reduces human errors, and ensures regulatory compliance.
• It automates processes and enables more agile and secure management.

Relationship with suppliers
One of the challenges lies in the diversity of supplier profiles:
Some are organized and technologically advanced.
Others face difficulties due to generational barriers or lack of digital training.

The solution lies in designing accessible and flexible processes that allow all suppliers to meet their documentary obligations without friction.

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Some are well organized and technologically advanced.
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The solution lies in designing accessible and flexible processes that allow all suppliers to meet their documentary obligations without friction.

Source: *Introducción a la gestión del conocimiento en las empresas biomédicas*

3. Case studies of tacit knowledge for business benefit (Part 2): Effective localization for successful global expansion

Date:02/07/ 2025

. The article explores how **tacit knowledge**—that is, knowledge that is not written or formally documented, such as customs, habits, and cultural preferences—can be key to the success or failure of companies seeking to expand globally.

Definition of tacit knowledge
According to Stuart French, tacit knowledge:

- Is intuitive, experiential, and non-verbalized.
- Is transmitted through observation, practice, and mentoring.
- Is essential for innovation, quality, and continuous improvement.

Case study 1: Toyota's failure

Mass recalls

- In 2009–2010, Toyota recalled 5 million vehicles due to unintended acceleration.
- In total, more than 27 million vehicles were recalled in the U.S. by 2024.

Consequences

- 89 deaths and 57 injuries were linked to the issue.
- Toyota was accused of concealing information and making misleading statements.
- It paid a criminal settlement of $1.3 billion in the U.S.

Ignoring tacit knowledge

- Customers and emergency services reported problems as early as 2000.
- Toyota did not listen to or act on these reports.
- In Australia, it even legally threatened a workshop that shared information about faults in DPF filters.

Court rulings

- In 2022, the Federal Court of Australia ruled that Toyota engaged in misleading conduct.

- It could pay more than $2 billion in compensation to affected customers.

Conclusion
Toyota failed by not integrating the tacit knowledge of its customers, resulting in economic, reputational, and human damage.

Case study 2: Xiaomi's success

Community-centered approach

- Xiaomi interacts directly with its user community.
- It actively listens to their problems and suggestions.

User-driven innovation

- Customers' tacit knowledge feeds innovation.
- Problems are identified and resolved quickly.

Result
An agile, customer-centric company that leverages tacit knowledge as a competitive advantage.

Case study 3: BMW's potential success

Recalls also present

- BMW has also faced recalls (e.g., 720,000 vehicles in 2024).

Use of AI for tacit knowledge

- BMW Korea implemented a GPT-4o-based Voice of Customer (VoC) analysis system.
- It classifies and analyzes customer feedback to detect trends and issues.

Open access

- The entire organization can access this information through an internal website.
- This improves proactive response and service quality.

Case study 4: Walmart's failure

Walmart: a successful giant in the U.S., but struggling abroad

- Although it tops the Fortune 500 ranking, Walmart has had **mixed results** outside the U.S.
- Notable failures in **Germany and Japan**, and difficulties in **China**.

Localization problems

- Walmart **did not adapt its business model** to local cultures.
- It ignored tacit knowledge of local communities, such as:
    - Preference for small stores in Germany.
    - Daily shopping habits in China.
    - Emphasis on quality and personalized service in Japan.

Concrete examples

- In Germany, customers felt uncomfortable with the overly “friendly” service style.
- In Japan, the low-price strategy clashed with a preference for quality.
- In China, large and distant stores did not fit frequent, nearby shopping habits.

Growing risk

- If Walmart does not change its approach, it could also fail in China.
- Personal example from the author: in Baotou (China), two Walmart stores closed shortly after opening, while local supermarkets thrived.

KFC: pioneer of Western fast food in China

- Opened in Beijing in 1987.
- Today it has more than **11,900 outlets in over 2,300 Chinese cities**, far surpassing its U.S. presence.

Effective localization strategy

- Hired **experienced local managers** instead of Americans.
- Leveraged the tacit knowledge of customers and communities.
- Has **540 million members** in its loyalty program in China.

Menu adaptation

- A menu very different from that of the U.S., including items such as:
    - Egg porridge with seafood.
    - Rice balls, soy milk, fried dough sticks.
    - The famous “Beijing-style Chicken Roll,” inspired by Peking duck.

Regional localization

- In 2022, it launched **12 regional products** across 10 local markets.
    - Examples: spicy noodles in Wuhan, xiaolongbao in Hangzhou, hulatang soup.

Success in other countries

- In India, it adapted its menu with vegetarian options and local flavors.
- It avoids beef and pork out of respect for religious sensitivities.

Source: *I Estudios de casos de conocimiento tácito para beneficio empresarial (parte 2): Localización eficaz para una expansión global exitosa – KW Foundation*

4. Data analysis and AI in professional tennis betting tools

Fuente: 17/12/2025

The article analyzes how artificial intelligence (AI) and data analysis are transforming the world of odds in professional tennis, especially in the field of betting and predictions. It focuses on the benefits, risks, and ethical and technical limits of this trend.

Use of AI in odds and predictions

Bookmakers and sports platforms use AI-based predictive models to calculate more accurate odds.

These models process large volumes of data:

• Match history.
• Performance by surface.
• Weather conditions.
• The player's physical and psychological condition.

AI makes it possible to adjust odds in real time in response to unexpected events (injuries, changes in strategy).

Advantages

- Greater accuracy in predictions compared to traditional methods.
- Dynamic updating of odds during the match.
- Risk optimization for operators and bettors.

Limits and risks

- Excessive dependence on algorithms: models may fail when faced with unpredictable human factors.
- Data bias: if historical data is incomplete or biased, AI amplifies errors.

Ethical risks:

- Possible manipulation of odds.
- Improper use of players' personal data.
- Limited transparency: many systems are black boxes, making it difficult to audit decisions.

Future trends

- Integration of AI with biometric analysis and real-time sensors.

- Greater regulation to ensure fairness and transparency in the use of AI in betting.
- Development of explainable models to reduce opacity in decision-making.

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***Source**: IA y cuotas en tenis profesional: datos y límites | Noticias de la Ciencia y la Tecnología (Amazings® / NCYT®)*

5. IUCN and its partners launch a new knowledge management platform on savannas and grasslands for Latin America

Date: 09/10/2025

Objective of the launch:
The International Union for Conservation of Nature (IUCN), together with strategic partners, introduced a global digital platform to centralize information on biodiversity, conservation, and nature-based solutions.
Main features:
• It brings together scientific data, case studies, tools, and best practices in a single space.
• It facilitates collaboration among governments, NGOs, the private sector, and local communities.
• It includes features for advanced search, experience sharing, and training.
Expected impact:
The platform aims to improve decision-making, accelerate the implementation of environmental policies, and support international commitments such as the Kunming–Montreal Global Biodiversity Framework.
Statements:
IUCN emphasized that knowledge management is essential to address the biodiversity crisis and climate change, promoting evidence-based solutions and global cooperation.
Future outlook:
The platform is expected to become a global benchmark for the planning and implementation of conservation projects, integrating artificial intelligence and predictive analytics in future phases.

Source: I*La UICN y sus socios lanzan una nueva plataforma de gestión del conocimiento sobre sabanas y pastizales para América Latina - Noticias | IUCN*

BIM (Building Information Modelling)

6. A municipal web application will provide real-time information on closures and detours during the undergrounding of the A-5: including 2D maps and traffic cameras

Date: 27/01/2025

Madrid City Council has designed and activated a web application to monitor the progress of the underground works on the A-5 for the construction of the future Paseo Verde del Suroeste. Through this tool, users can view traffic detours and road closures in real time. In this way, the Department of Urban Planning, Environment, and Mobility, headed by Borja Carabante, strengthens the information provided to citizens regarding traffic incidents caused by works that are expected to last for two years.

Image of the Madrid City Council's application to follow the A-5 works.

According to the City Council, the application is very easy to use and highly practical: "In a simple way, both those affected by these works and any resident of Madrid who needs to travel through this southern area of the city will be able to stay informed about the evolution of the detours activated at any given time," the local authority adds. It includes a viewer that enables intuitive consultation of all disruptions, featuring a 2D satellite map that provides traffic information, updated closures, and access to DGT traffic cameras.

In addition, the web application also displays three-dimensional information about the entire area, such as 3D building cartography and models of the new layouts, which have been generated using the BIM (Building Information Modeling) methodology applied in this project.

The application also includes a set of functionalities designed to provide all necessary information to users, including real-time traffic flow data and graphical access to the main recommended alternative routes. It will also inform users about upcoming detours or road modifications so they can plan their journeys in advance. All this information is accessible from any browser and device, without the need to install any plug-ins or face any limitations. “In this way, by disseminating information openly and accessibly, Madrid City Council doubles down on its commitment to introducing this type of application, following the pioneering experience successfully developed during the works on the Nudo Norte,” the City Council told this newspaper.

It is worth recalling that, before the start of the works, the city had already launched a website dedicated exclusively to the Paseo Verde del Suroeste project, where all details of the project, its phases, and its tendering process can be consulted. This site now also includes a direct link to the web application providing traffic detour information.

The covering of the A-5 will make it possible to extend the pedestrianized boulevard of Avenida de Portugal, which connects to Madrid Río, as far as Avenida del Padre Piquer, through a 3.2-kilometer underground section. Surface traffic will be reduced by 90%, as will polluting emissions. In addition to reclaiming asphalt-covered space for local residents, the project will improve pedestrian, public transport, and road mobility, enhancing road safety in the area.

Source: *https://www.elmundo.es/madrid/2025/01/27/679697adfdddffa7428b457c.html*

7. Transport awards a €3.92 million contract to implement the BIM methodology at the Directorate-General for Roads

• Building Information Modeling (BIM) promotes a collaborative way of working around a digital model, leveraging new technologies.
• The BIM methodology is one of the pillars of the Digitalization Plan of the Directorate-General for Roads, as it makes it possible to optimize the planning, design, and construction of infrastructure, laying the foundations for future integrated management.
• This contract is part of the strategy of the General State Administration to progressively incorporate the BIM methodology into public procurement.

The Ministry of Transport and Sustainable Mobility has awarded a €3.921 million (VAT included) contract for support services to the Directorate-General for Roads (DGC) to define and develop the strategy for implementing the BIM methodology in its projects and works.

The incorporation of this technology into the Directorate-General for Roads will make it possible to optimize infrastructure planning, design, and construction, as well as to lay the foundations for future integrated management.

In particular, the technical assistance service will include the following tasks:
• Definition of the strategy for BIM implementation at the DGC: prior analysis, definition of objectives, monitoring, review, and updating

• Development of BIM Requirements to be included in tender documents, taking as a starting point those already established by the DGC. In addition, the BIM requirements must evolve during the term of the contract, taking into account, among other aspects, the milestones of the BIM Plan

.• Development of BIM Guides and Manuals linked to the processes, procedures, and workflows of the Directorate-General for Roads.

• BIM training for staff of the Directorate-General for Roads

• Continuous assistance and support for the use of the BIM methodology in projects and construction works, including support for resolving queries.

• Review of BIM deliverables, including the review of execution plans. This will allow feedback into the initially defined implementation strategy, as well as ensuring the quality and consistency of these deliverables

• Drafting of reports related to BIM.

About Building Information Modeling

Building Information Modeling (BIM) is a collaborative working methodology for managing building and civil engineering projects through a digital model. This digital model forms a large database that makes it possible to manage the elements that make up the infrastructure throughout its entire life cycle. The use of this methodology enables more sustainable construction and building policies and greater efficiency in public spending.

This contract forms part of the strategy of the General State Administration to progressively incorporate the BIM methodology into public procurement, as set out in the BIM Plan prepared by the Interministerial BIM Commission and approved by the Council of Ministers on 27 June 2023.

It is worth recalling that, prior to the start of the works, Madrid City Council had already activated a website devoted exclusively to the Paseo Verde del Suroeste project, where all the details of the project, its phases, and its tendering process can be consulted. This site now also includes a direct link to the web application providing traffic detour information.

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Source: *https://www.transportes.gob.es/ministerio/comunicacion/sala-prensa/lun-18082025-1223*

8. Adif commits to BIM to modernize commuter rail stations

Date: 19/05//2025

The tender has been published for the project to remodel the tracks and platforms at Alcalá de Henares, La Garena, and Soto del Henares stations in Madrid.

Adif has opened the tender for the drafting of the project to remodel the tracks and platforms at Alcalá de Henares station and the La Garena and Soto del Henares stops, all part of the Madrid commuter rail network. With this intervention, the modernization of one of the busiest corridors in Spain begins. Among other requirements, the project includes the use of the groundbreaking collaborative working methodology BIM, with the aim of maintaining more efficient, collaborative, and transparent planning throughout the entire project.

Included in the Madrid Commuter Rail Plan, this action proposes increasing Civis (semi-direct) services on the Chamartín–San Fernando route via the bypass line, as well as reducing traffic interference. These objectives will be achieved by adapting platforms and tracks to current standards of functionality, safety, and accessibility. The project drafting contract has a starting budget of €2.15 million, and the awarded company will have up to 38 months for its execution, divided into two phases. The first phase will allocate 20 months to project drafting, while the second phase, lasting 18 months, will be dedicated to support reports during construction.

In the task of modernizing and renewing railway tracks, the public promoter relies on technologies already well established in the sector, ensuring more efficient, sustainable, and safer project outcomes for all users. This is the case with BIM (Building Information Modeling). Specifically, Adif includes this digitalization and collaborative working methodology in its 2030 Plan, as explained by Javier Lozano López, Subdirector of BIM and Digital Continuity at Adif, in an interview for the AbiertoXObras section of the specialized company Espacio BIM (www.espaciobim.com): “The implementation of BIM is part of Adif’s Strategic Plan 2030, which is an extremely ambitious plan. It aims to optimize Adif’s competitiveness and sustainability in the management and operation of railway infrastructure, addressing future challenges.”

Far from being an emerging tool, BIM has already been defining the way professionals in the country’s AECO sector design and build for several years, through specialized tools such as Revit, the world’s most widely used BIM modeling software; ArchiCAD, another popular building design tool; or Civil 3D, a design software specifically for civil engineering. In the case of companies such as Adif, BIM has become a comprehensive approach that allows them to “centralize all project information (geometric, documentary, etc.) in a digital model developed by all the agents involved,” as explained by Borja Sánchez Ortega, Project Director and Director of the renowned International BIM Manager’s Master’s degree (+AI and VR) at the aforementioned specialized company. –sn–

Source: *https://sociedad-noticias.com/2025/05/19/adif-apuesta-por-bim-para-modernizar-estaciones-de-cercanias/*

9. Convensa and FCC Construcción use geospatial technology to build the Ruby Line of the Porto Metro

Date: 07/05//2025

FCC Construcción and Convensa were awarded the project for the new Ruby Line (H) of the Porto Metro (Portugal), between Casa da Música and Santo Ovídio. The project, with a value of more than €379 million, represents the largest undertaking of Portugal's Recovery and Resilience Plan signed to date.

This project, which has established itself as an example of innovation within the AEC sector, was presented at the Esri International Infrastructure Management & GIS Conference (IMGIS), one of the most important global events in the AEC sector. At the conference, the company explained to more than 1,000 professionals how cutting-edge technological solutions—such as GIS-BIM workflows and digital twins, among others—have been used to expand a metro network that carried 79 million passengers in 2023.

Digital twins—virtual representations of the real world that include physical objects, processes, relationships, and behaviors, and that allow the functioning of territory and infrastructure to be replicated in a controlled and scalable environment—have been used in this project to visualize, analyze, and monitor all kinds of relevant parameters and processes. These include construction progress, the generation of 3D models from LIDAR point clouds, and integration with the GIS-BIM workflow.

FCC Construcción highlighted that it is at the technological forefront of the sector, something clearly demonstrated in the development of the Porto Metro's Ruby Line through the use of the BIM methodology and Geographic Information Systems (GIS).

The project features an advanced technological integration system based on GIS-BIM workflows, enabling centralized and geolocated management of all construction models, as well as other spatial data sources related to the project, including the integration of data observed by external monitoring platforms.

Through the ArcGIS platform and the Autodesk cloud, BIM models are automatically synchronized with real-time data, facilitating collaborative work among teams. In addition, thanks to LIDAR scans, 360º cameras, and aerial photogrammetry, it is possible to generate high-precision digital twins, which are essential for technical monitoring and strategic decision-making.

In the words of Cristina Carrera, Team Lead Utilities & AEC at Esri Spain, "the use of digital twins with BIM & GIS information in an infrastructure project allows for better understanding and monitoring of the works, operating in a collaborative environment, which

translates into reduced timeframes and costs and more efficient management of project resources and materials."

By using an integration system such as ArcGIS—which enables and fosters data and system interoperability and collaboration—it has been possible to better visualize and control the monitoring system made up of sensors such as inclinometers, piezometers, optical systems, among others. The data from these sensors can be consulted in a unified way through a single dashboard, allowing real-time observation of the evolution of both the works and the surrounding environment.

According to José Rafael Camacho Montes, Head of the Technical Office of the Ruby Line Consortium, "the incorporation of GIS-BIM technology and reality capture tools, such as drones or 360º cameras, and the integration of monitoring data into a single platform has allowed us to make a qualitative leap in the management of complex infrastructure. Thanks to these solutions, we not only improve efficiency and control of the project, but also reinforce our commitment to the environment and sustainability."

ENVIRONMENT

FCC Construcción and Convensa, using Esri technology, have been able to catalogue all tree masses located within the project's area of influence and label which ones could be affected by construction progress, as well as the degree of impact.

This information is accessible in real time and is shared with municipal authorities and services, facilitating joint decision-making. In addition, the inventory and monitoring process has been optimized through the use of mobile applications, speeding up data collection, reducing errors, and improving traceability of actions. This tool not only makes it possible to plan protection or transplant measures, but also helps maintain a comprehensive view of the project's environmental impact.

Source: *https://www.lavanguardia.com/economia/20250507/10654892/convensa-fcc-construccion-emplean-tecnologia-geoespacial-construir-linea-rubi-metro-oporto-agencias lv20250507.html*

10. As of January 1, 2026, the update of the thresholds for SARA contracts comes into force, and the BIM Plan thresholds are updated

Date: 19/12/2025

The European Commission (EC) has published the new thresholds, which will apply from January 1, 2026, to December 31, 2027, in all EU Member States for contracts subject to harmonized public procurement (SARA).
In the case of public contracts for works, supplies, services, and design contests, this update is set out in Delegated Regulation (EU) 2025/2152, which amends Directive 2014/24/EU of the European Parliament and of the Council on public procurement, published in the Official Journal of the European Union (OJEU) on October 23, 2025.
This is a biennial update carried out to ensure equal access, transparency in public procurement, and free competition among companies from all Member States. Through this update, the European Commission adjusts euro values to variations in the Special Drawing Rights (SDR) of the World Trade Organization (WTO) Agreement on Government Procurement, which serves as the international reference for public procurement thresholds.
Depending on the type of contract, for works contracts and works concessions, the EC has set the new threshold at €5,404,000, representing a reduction of €134,000 compared to the previous period threshold (€5,538,000, valid until December 31, 2025).
This update has a direct impact on the BIM Plan, which, in accordance with it, updates the upper threshold of the Estimated Contract Value range to which it applies. Thus, as of January 1 of the coming year, construction-related contracts with an estimated value of:

Equal to or greater than €5,404,000 must include BIM information requirements corresponding to a Medium BIM Level in their tendering procedure.
Lower than €5,404,000 and equal to or greater than €2,000,000 will require the use of BIM at an Initial BIM Level.

In addition, for related service contracts (such as construction supervision services, technical assistance to site management, technical assistance for supervision, control, and health and safety coordination) or preliminary services (such as project drafting), BIM at a Medium BIM Level will be required when the related works or works concession contracts exceed the new threshold of €5,404,000.
The BIM Plan aligns with the policy of promoting innovation through strategic public procurement promoted by the European Commission, as well as with the National Public Procurement Strategy.
BIM, building together.
More information about the #BIM Plan

Source: *https://cibim.transportes.gob.es/sala-de-prensa/noticias/partir-del-1-de-enero-de-2026-entra-en-vigor-la-actualizacion-de-los*

11. AI in project and construction management: definition, real scope, and current uses:

Date: 31/10/2025

In almost every industry, it is normal to talk about Business Intelligence, prediction, automation, or ERP systems. In automotive or aerospace, no one questions whether to design in 2D or 3D, or whether to use an ERP or Excel. However, in construction we are still debating whether to use BIM or not, whether to use a notebook or a tablet, and things like automation, BI, or bringing a LiDAR scanner to site still seem like science fiction. The same happens with AI: there are expectations, but very little real adoption.

Where do we start?

The sector is complex, yes, but that does not invalidate techniques that already work in other fields. I like to explain AI-driven construction project management using the analogy of a journey from A (the idea) to B (the completed project). How do you travel?

On foot, with a paper map and no instruments? By car with a map but no indicators or Google Maps? Or by car with all indicators and navigation? The difference is not just the vehicle: it is the instruments and the discipline in using them.

Therefore, applied AI has many branches, but the one that interests us most in management is one: **AI agents**.

What are AI agents?

In 2025 everyone is talking about “AI agents.” Let’s translate this without hype: An agent is an AI-driven system that, in addition to understanding natural language, can use tools, plan steps, and execute actions with permissions and traceability. It is useful when tasks need to be chained, decisions justified, and nothing should break along the way.

Before that, three ideas to avoid disappointment:

1. This is about data: AI is largely advanced data processing. Without organized sources, it will fail.
2. Base models are biased: GPT, Gemini, and others “hallucinate” if they are not given high-quality context.
3. AI ≠ agent: AI “responds”; an agent also acts with tools and plans what to do next.

What capabilities do AI agents have?

1. Perceive
What it involves: ingesting heterogeneous information and understanding its minimum structure.
Typical sources: documents, emails, schedules, incidents, repositories, BIM, databases, internal websites, APIs.
AEC examples: reading a tender document in PDF and a Primavera schedule; extracting changes from an email thread; querying an IFC model and a BC3 file.

2. Process and plan
What it involves: interpreting text/tables/images, breaking a task into steps, replanning based on intermediate results.
How it is done: LLM + rules/validators + specialized prompts or sub-agents.
AEC examples: normalizing bids, detecting inconsistencies between planning and quantities, preparing an agenda with critical points.

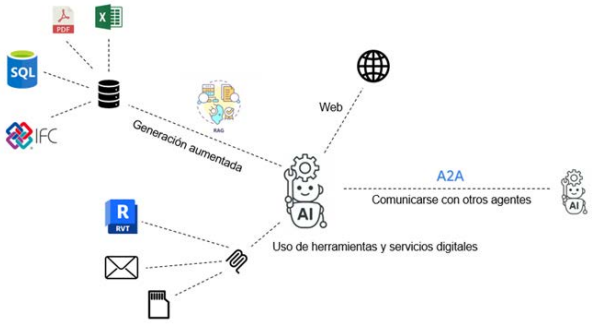
3. Act
What it involves: executing actions in systems with minimal permissions and full traceability.
Typical actions: generating drafts, running SQL/GraphQL queries, filling in form fields, invoking corporate APIs, opening tickets.
AEC examples: creating a draft set of meeting minutes with agreements and responsibilities, updating the status of an item in the CDE, issuing a query to suppliers.

4. Learn and adapt
What it involves: improving through controlled memory, fine-tuning and internal knowledge (RAG), and self-correcting before delivery.
Mechanisms: project memory, lessons learned, automatic checklists, output benchmarks, fine-tuning.
AEC examples: maintaining client-specific terminology, remembering contractual exceptions, applying quality checklists before publishing a report, improving results with each iteration.

Minimum conditions for it to work:
• Accessible, high-quality, well-governed data (versioning, metadata, sources of truth, ETL).
• Permissions and segregation by role and environment; no “open-bar” credentials.

- Full traceability of decisions and actions.
- Human review before publishing or making decisions.

A well-trained AI with the right tools can truly be disruptive.



Source: *https://www.bimcommunity.com/ia-en-gestion-de-proyectos-y-obra-alcance/*


Sustainability in cons-
truction

Sustainability in Construction

12. Absorb, filter, store: 9 projects show how sponge cities are adapting to climate challenges

Date: 11/03/2025

The concept of **“sponge cities”** has gained relevance since it was introduced by Chinese landscape architect Kongjian Yu, founder of Turenscape, and was officially adopted as a national policy in China in 2013 to combat urban flooding.

This approach prioritizes nature-based infrastructure such as wetlands, rain gardens, and permeable pavements, creating landscapes with porous soil where native plants can thrive with minimal maintenance. When it rains, these systems absorb and slow down water flow, reducing flood risks. In contrast, traditional drainage solutions based on concrete and pipes, although widely used, are costly, rigid, and require frequent maintenance, sometimes even making cities more vulnerable to flooding due to blockages and overflows.

In addition, sponge city strategies have proven to be more cost-effective. For example, the program in Wuhan saved more than 4 billion yuan (USD 550 million) compared to conventional concrete-based alternatives, according to a policy report by the University of Leeds. By integrating ecological systems into urban landscapes, sponge cities offer an adaptable and economically viable approach to water management. This article organizes sponge city projects according to their primary hydrological function, recognizing that different strategies play complementary roles in mitigating urban flooding and improving water resilience. While many projects incorporate multiple functions, it highlights their dominant contributions to water-sensitive urban design.

Source:https://www.archdaily.cl/cl/1027529/absorber-filtrar-almacenar-9-proyectos-muestran-como-las-ciudades-esponja-se-adaptan-a-los-desafios-climaticos

13. Mineral wool: a key solution for reducing the carbon footprint of buildings

Date: 24/04/2025

A study by Arup for AFELMA shows that this material accounts for only 2.5% of embodied carbon and significantly improves a building's energy efficiency. Mineral wool reduces the carbon footprint from the construction phase and guarantees sustainable energy savings.

Looking ahead to 2050, the building sector must face a key challenge: achieving carbon neutrality. To accomplish this, it is essential to minimize the carbon footprint of construction materials as much as possible. Currently, buildings generate more than one third of global greenhouse gas emissions, making this sector a priority for meeting international climate commitments.

In this context, AFELMA (the Spanish Association of Mineral Wool Insulation Manufacturers) commissioned the consultancy Arup to carry out a technical study aimed at analyzing the real impact of this material on the decarbonization process of the built environment.

The analysis focused on a typical mid-rise residential building located in Madrid, designed in accordance with the Spanish Building Technical Code. The study considers both embodied carbon, which includes construction materials and processes, and operational carbon, linked to energy consumption over the building's ser

vice life. To this end, Arup developed three phases of analysis:

building characterization,

life cycle assessment,

sensitivity analysis across different scenarios and façade types.

Among the most notable results, the study concludes that the use of mineral wool represents only 2.5% of total embodied carbon, well below materials such as concrete or steel, which together can account for up to 55%. In addition, thermal insulation with mineral wool contributes significantly to reducing operational carbon by improving the building's energy performance.

"Understanding the impact of each material is key to designing more sustainable buildings from the earliest stage of the project. This type of study helps us understand the real effect of our design decisions and identify opportunities to apply more efficient materials," says Olatz Pombo, Senior Climate and Sustainability Consultant at Arup.

In short, the study confirms that mineral wool positions itself as an effective and sustainable construction solution. Its low initial environmental impact, combined with its ability to deliver energy savings throughout the entire life cycle of the building, makes it a strategic ally in meeting future, more demanding sustainability and energy efficiency regulations. The concrete that will change construction: it is 3D-printed, captures 142% more carbon, and is "just as strong

***Source**: https://construnews.com/construpedia/rehabilitacion-de-edificios-con-lanas-minerales-aislantes-rehabilitacion-de-instalaciones/*

14. The concrete that will change construction: it is 3D-printed, captures 142% more carbon, and is “just as strong

Date: 26/07/2025

A type of concrete developed by a team of researchers at the University of Pennsylvania in Philadelphia (United States) is set to transform the construction industry. It is 3D-printed, captures 142% more carbon than traditional materials, and is extremely strong.

A team of researchers at the University of Pennsylvania has developed a new type of concrete that promises to revolutionize the construction industry. This material, 3D-printed and bio-infused with fossil microalgae, not only meets traditional structural requirements but also captures more carbon dioxide than it emits during its production, making it a highly sustainable solution.

The concrete is inspired by the fossilized architecture of diatoms—microalgae with hard shells—whose porous structure and large surface area promote CO_2 absorption without compromising material strength. In fact, researchers have managed to increase strength over time, which is unusual for porous materials. Thanks to diatomaceous earth, this concrete improves its rheology, enabling more precise printing and the creation of complex geometric forms that increase the carbon capture surface area by up to 500%. In addition, cement use is reduced by up to 60%, lowering the environmental impact. The design, which includes lattice-like structures inspired by bones and shells, maintains structural integrity while maximizing ecological efficiency.

Currently, the team is testing this concrete in real-world applications such as pavements and façades and is exploring the possibility of completely eliminating cement or

incorporating waste materials as reactive components. This innovation opens the door to a new structural logic in construction, where materials not only bear loads but also actively interact with the environment to enhance sustainability.

Source:*El hormigón que cambiará la construcción: está impreso en 3D, captura un 142 % más de carbono y "es igual de resistente"*

15. The Spanish asphalt that will change roads: it is more resistant to cracks and is made from cigarette butts

Date: 14/09/2025

Researchers from the University of Granada, in collaboration with the University of Bologna, have developed a new type of asphalt that could transform road construction by incorporating cigarette butts as an additive.

This breakthrough arises in response to the growing accumulation of cigarette butts, one of the most polluting types of waste on the planet—an issue further aggravated by the rise of electronic cigarettes. The project, co-financed by the Government of China, makes use of the unburned portion of cigarette butts—rich in cellulose fibers and biodegradable plastics—to manufacture pellets that are incorporated into the asphalt mixture. These pellets, treated with Fischer–Tropsch-type waxes, release fibers when mixed with hot bitumen, reinforcing the pavement matrix and improving its resistance to cracks and fissures. In addition, they increase asphalt flexibility, reduce manufacturing temperature, and lower energy consumption and pollutant emissions.

Tests conducted have shown that this asphalt, composed of 40% recycled material, outperforms conventional asphalt in terms of durability and resistance, both to traffic loads and thermal variations. This innovation not only offers an effective technical solution but also represents a circular economy model that could be replicated globally, helping to remove millions of cigarette butts from natural environments each year.

More resistant and more sustainable

The Construction Engineering Laboratory at the University of Granada, led by Carmen Rubio Gámez and Fernando Moreno Navarro, evaluated the resistance of asphalts

manufactured with 40% recycled material by weight, sourced from deteriorated roads and pellets made from electronic cigarette butts.

Researchers from the University of Granada explained in a statement that during asphalt production, when the pellets come into contact with hot bitumen, the wax melts and releases recycled cellulose and plastic fibers from the cigarette butts. These fibers act as reinforcement within the asphalt matrix, increasing resistance to cracking and fissuring, while also acting as a binder retainer. This allows for a higher binder content, making the asphalt more ductile and flexible.

In addition, the presence of the waxes helps modify the viscosity of the bitumen and reduce the manufacturing temperature of the mixture, thereby lowering energy consumption and emissions of polluting gases.

Source: *https://www.msn.com/es-es/salud/bienestar/el-innovador-ladrillo-que-cambiar%C3%A1-la-construcci%C3%B3n-es-m%C3%A1s-ligero-ecol%C3%B3gico-y-est%C3%A1-hecho-con-algas-marinas/ar-AA1MuZsa?ocid=BingNewsVerp*

16. Seashells could change concrete: the unexpected solution to reduce CO_2 in construction

Date: 19/12//2025

Concrete is essential for modern cities, but its climate impact is enormous. A new study proposes an alternative that is as simple as it is surprising: reusing seashells to replace part of the cement. The result promises more sustainable buildings without sacrificing structural strength.

Concrete, a key component of our infrastructure, generates nearly 8% of global CO_2 emissions, mainly due to the calcination of limestone required to produce Portland cement. A study by the University of East London proposes a sustainable alternative: replacing 15–30% of cement with seashell powder, an abundant waste rich in calcium carbonate, similar to that found in traditional limestone. The results are promising:

• CO_2 emissions are reduced by up to 36%, equivalent to eliminating approximately 119 kg of carbon dioxide per cubic meter of concrete produced.

• With moderate replacement levels (15%), concrete retains its compressive strength, offering the same structural performance as conventional concrete.

• An improvement in internal density and a reduction in porosity are also observed, enhancing durability and resistance to corrosion.

Beyond its technical properties, this solution represents a simple and effective innovation: it turns coastal waste into a valuable resource, contributing to the circular economy, reducing pressure on landfills, and limiting the extraction of raw materials. Even partial adoption of this recycled concrete can generate a significant environmental impact without compromising building functionality. Ultimately, this proposal shows that sometimes the most relevant solutions to climate change lie in the intelligent use of what already exists.

Source: *Las conchas del mar podrían cambiar el hormigón: la solución inesperada para reducir el CO_2 de la construcción*

Process Digitalization

17. María José Conde Laza: “New technologies are revolutionizing the construction sector, delivering significant value on the path toward sustainability, energy efficiency, and the circular economy

Date: 21/01/2025

Construction is one of the sectors with the greatest direct and global impact on economic, environmental, and social development. Today, we speak with María José Conde Laza, Head of the National R&D&I Department at FCC Construcción, to learn how the company’s R&D&I policy and innovative vision have enabled it to overcome challenges and become a benchmark organization, providing services to more than 600 million citizens worldwide.

María José Conde Laza, Head of the National R&D&I Department at FCC Construcción.

FCC Construcción has been operating in the construction sector for more than 120 years.

How has the sector evolved during this time?**

At FCC, we are celebrating 125 years as a benchmark in the sector since we began our work by building four docks at the Port of Barcelona—key infrastructure for maritime trade in the Mediterranean. We continued with railway development on the Girona–Olot section, as well as projects such as the urbanization of Gran Vía–Diagonal and the paving of Paseo del Triunfo in the early 1900s.

There is no denying that the modernization of the country has gone hand in hand with FCC, through the construction of bridges, highways and motorways, airport terminals and runways, metro lines, railway infrastructure, and hospitals. At each new stage, we have contributed to improving quality of life in many

cities. In our drive for innovation, the company was also a pioneer in the use of materials such as prestressed concrete for urban structures.

Construction has traditionally been a very conservative sector. In this regard, Industry 4.0, sector digitalization, and the push from major institutions are contributing to a faster evolution.

****You highlight your R&D&I policy as a key factor for progress in the sector.**

How has your commitment to R&D&I helped over the years?**

FCC Construcción is a pioneering company in implementing a structured R&D&I Policy. The development and application of innovative technologies in projects, activities, and internal management processes provide significant added value and represent a key differentiator in today's highly competitive and internationalized market.

Within the construction area of the FCC Group, an innovative culture is promoted through initiatives such as:

- Supporting creativity
- Developing national and international R&D&I projects, individually or within consortia
- Certification of innovative construction activities
- Technology watch and strategic intelligence
- Industrial and intellectual property management

The R&D&I Policy is implemented through an R&D&I Strategy aimed at achieving corporate strategic objectives such as:

- Process digitalization in production centers
- Knowledge management
- Innovation in activities such as railway infrastructure, maritime works, roads, and building
- Sustainability in construction
- Artificial intelligence to improve internal processes
- Virtual and augmented reality
- Robotics applied to specific construction phases (drones and robots)
- Cybersecurity and data protection

To date, FCC Construcción has participated in 95 nationally funded projects, 20 international projects, and has obtained 240 certifications for innovative actions at work sites.

****Along these R&D&I lines, you lead the 0ACCIDNTES project…**

Why are these projects important, and what does collaboration with Technology Centers like CETIM bring?**

Through 0ACCIDNTES, FCC Construcción will deploy a cutting-edge tool for occupational risk prevention and management, enabling progress toward zero workplace accidents. This delivers direct benefits both in competitiveness—by reducing accident-related costs—and in worker safety, health, and well-being.

Key challenges addressed by the project include:

- Developing a digital identity system linking workers to roles and PPE, enabling monitoring through sensorized equipment
- Monitoring and predicting air quality in confined environments
- Inspecting hazardous work areas using autonomous robotic systems, such as quadruped robots
- Developing shared situational awareness between worker, machine, and environment
- Creating a digital twin-based safety platform to compare real and theoretical risks
- Validation in controlled environments

0ACCIDNTES is funded by CDTI and supported by a multidisciplinary consortium of companies and technology centers, including CETIM, whose scientific-technical expertise adds strong value and complementarity.

****You have received numerous awards, including for the Santiago Bernabéu Stadium renovation.**

What is the key to your success?**

FCC Construcción has consistently placed citizens at the center of its projects, a strategy that resulted in 23 national and international awards in 2023.

Our projects align with EU Environmental Taxonomy principles, including:

- Climate change mitigation and adaptation
- Sustainable use of water and marine resources
- Transition to a circular economy
- Pollution prevention and control

- Protection and restoration of biodiversity

What value do new technologies bring to sustainability and the circular economy?

New technologies are transforming construction by improving resource efficiency and reducing environmental impact.

Technologies such as IoT and Big Data enable efficient monitoring, waste reduction, and optimized material use. 3D printing and advanced robotics support reuse and circular construction models.

Advanced design and simulation software enables the creation of energy-efficient buildings, reducing the carbon footprint across the entire life cycle—from design to end-of-life.

The integration of renewable energy technologies, low-emission materials, and cleaner construction processes is essential for sector decarbonization.

Innovation not only enhances sustainability but also creates new business and employment opportunities, particularly in recycling, repair, and waste management. *If we want to do things better, we must do them differently. That difference is innovation.*

What are FCC Construcción's innovation goals for the coming year?

We will continue investing in innovation and process digitalization, including the methodological development of Building Information Modeling (BIM), while actively participating in European and national initiatives.

What challenges lie ahead?

While construction has traditionally been conservative, digitalization and Industry 4.0 are accelerating transformation. FCC Construcción will continue investing in R&D&I projects focused on sustainability, operational optimization, and continuous improvement through innovative technologies.

Source: *https://cetim.es/maria-jose-conde-laza-las-nuevas-tecnologias-estan-revolucionando-el-sector-de-la-construccion-aportando-un-valor-significativo-en-el-camino-hacia-la-sostenibilidad-la-eficiencia-energetic/*

18. At CETIM in 2025 we continue our commitment to Public–Private collaboration
Date: 21/01/2025

Date: 21/01/2025

We begin the new year with the launch of a call by the State Research Agency aimed at promoting public–private collaboration in a knowledge transfer phase close to production processes and the market, in which our Technology Center has achieved a 100% success rate.

DEMOLTECH consortium during the visit to the demolition site located in Soria.

What defines us is collaboration with other public and private entities at both national and European levels. Since our beginnings, we have steadily strengthened our client portfolio, now working with more than 280 collaborators. At the international level alone, we have collaborated with 62 partners and led six global initiatives, mobilizing more than €27 million.

Thanks to this collaborative environment, throughout 2024 we promoted a total of 80 research projects in key sectors such as batteries and electric vehicles, forestry, construction, industry, textiles, electronics and ICT, water treatment and nutrient recovery, agrifood, and others.

And 2025 also looks promising, as it begins with the opening by the State Research Agency of the Public–Private Collaboration Projects call, which will mobilize €320 million. The main objective of this call is to fund three-year collaborative projects between research centers, universities, public research organizations, and companies, advancing the incorporation of scientific and technical knowledge and results that enable validation and pre-competitive development of new technologies, products, and services.

To date, CETIM has achieved a 100% success rate, making it the second research organization in Galicia with the highest level of success. Examples from

the latest call include the projects SMMASH, QUITISENCT, and DEMOLTECH. In SMMASH, we will research sustainable materials and metals through the use of bottom and fly ashes from the energy recovery of municipal waste. In QUITINSECT, we will improve techniques for extracting and transforming chitin for high value-added applications in food packaging. For now, we would like to focus on DEMOLTECH, a project in which we will develop disruptive technologies for intelligent demolition and revalorization processes to generate circular raw materials in urban environments.

DEMOLTECH: Intelligent demolition and C&D waste valorization

Within the construction sector, there is widespread awareness of the large amount of construction and demolition waste (C&D waste) currently generated. In Spain alone, according to the Environmental Accounts of the National Statistics Institute (INE) for 2020, the construction sector was responsible for 30.8% of total waste generated in the country.

In this context, and given the diversity of industrial profiles in the sector, there is a need to develop collaborative tools that promote information exchange and enable the reuse of C&D waste. This is how DEMOLTECH was conceived—a project led by FCC Construcción and involving CETIM, BECSA, ITAINNOVA, and Grupo IDP. Its main objective is to create an integrated prototype demonstrator that incorporates digital tools for intelligent demolition and the revalorization of primary products in urban environments throughout the phases of a deconstruction project: design, material and raw material recovery, demolition works, waste management, recycling, and second-life applications.

DEMOLTECH: Intelligent demolition and revalorization processes for the generation of circular raw materials in urban environments.

Specifically, within DEMOLTECH, CETIM will develop a Digital Twin based on data captured through Computer Vision and Life Cycle Assessment, enabling identification of the most sustainable material solutions. In addition, we will incorporate blockchain to certify best practices during this phase of the process and collaborate with BECSA to research on-site and plant-based waste valorization techniques for construction and demolition waste.

Initial advances in the state of the art are currently underway, and this month the entire consortium visited the demolition site in the province of Soria, where validation of developments will be carried out in collaboration with FCC Construcción.

FCC Construcción – CETIM collaboration

FCC Construcción is a key collaborator for our Technology Center, with projects such as 0ACCIDNTES, which investigates new technologies to improve site monitoring and help prevent and respond more rapidly to workplace accidents. 0ACCIDNTES received the 2023 Best National Innovation Project Award from the Spanish Construction Technology Platform.

The strong commitment to R&D&I by leading companies such as FCC Construcción enables progress in addressing common challenges, such as increasing circularity and sustainability in the construction sector. At the same time, calls such as Public–Private Collaboration Projects represent an opportunity to mobilize private investment, create employment, and improve the country's technological balance.

DEMOLTECH is funded under the 2023 call for public grants for public–private collaboration projects, within the State Program to Promote Scientific-Technical Research and Its Transfer, part of the State Plan for Scientific, Technical, and Innovation Research 2021–2023. Project CPP2023-010533 funded by the Ministry of Science, Innovation and Universities / State Research Agency / 10.13039/501100011033 / ERDF, EU.

Source: *https://cetim.es/en-cetim-mantenemos-este-2025-nuestra-apuesta-por-la-colaboracion-publico-privada/*

19. The Ruby Line of the Porto Metro is being built using cutting-edge geospatial technology

Date: 16/05/2025

FCC Construcción and Convensa are leading a pioneering project in Portugal, integrating GIS-BIM solutions, digital twins, and intelligent sensors to build the new Ruby Line of the Porto Metro.

A flagship project for the future of infrastructure in Portugal

The consortium formed by FCC Construcción and Convensa, with technological support from Esri Spain, is developing the new Ruby Line (H) of the Porto Metro, an infrastructure connecting Casa da Música with Santo Ovídio. With an investment exceeding €379 million, it represents the largest project under Portugal's Recovery and Resilience Plan to date.

Innovation serving public transport

This initiative has gained international recognition at the Esri International Infrastructure Management & GIS Conference (IMGIS), where it was presented as a cutting-edge example within the AEC sector (Architecture, Engineering, and Construction). In 2023, the Porto metro network carried more than 79 million passengers, highlighting the importance of this expansion.

Digital twins and GIS-BIM workflows: the future is already here

Thanks to technologies such as 3D models, LIDAR point clouds, 360º imagery, and real-time data from monitoring sensors, digital twins have been created that replicate the behavior of the environment and allow precise tracking of construction progress.

The combined use of GIS (Geographic Information Systems) and BIM (Building Information Modeling) enables geolocated and collaborative management of all project data, integrating platforms such as ArcGIS and the Autodesk cloud to synchronize information in real time.

Environmental impact under control—just one click away

One of the most notable aspects of the project is environmental management. Using Esri tools, all tree masses within the construction area have been digitally catalogued, identifying those that may be affected. This information is shared in real time with local authorities, facilitating decision-making and the planning of protection or transplantation measures.

In addition, the use of mobile applications has optimized the collection of environmental data, reducing errors and improving traceability.

A shared vision of efficiency and sustainability

Cristina Carrera, from Esri Spain, highlights that “the use of digital twins with BIM and GIS information allows us to work in a collaborative environment, reducing time and costs and improving efficiency in the management of materials and resources.”

For his part, José Rafael Camacho Montes, from the Ruby Line consortium, states that these technologies “have enabled us to make a qualitative leap in the management of complex infrastructure, reinforcing our commitment to the environment.”

A flagship project for the future of infrastructure in Portugal

José Rafael Camacho Montes, from the Ruby Line consortium, reiterates that these technologies have allowed a qualitative leap in the management of complex infrastructure, strengthening their commitment to the environment.

Source: *https://obrasurbanas.es/linea-rubi-metro-oporto-tecnologia-geoespacial/*

20. The Renovation of the Santiago Bernabéu Stadium received the ACHE 2025 Award for its complex envelope, new retractable roof, and major structural innovation. It will be presented at the 9th ACHE Congress in Granada

Date: 02/2025

The Spanish Association of Structural Engineering (ACHE) has awarded the ACHE Prize to the Renovation Project of the Santiago Bernabéu Stadium in the Building category, in recognition of its contribution to structural engineering.

Outstanding structural elements:

New façade envelope and roof

An envelope of stainless steel louvers fixed to a suspended structure that wraps the entire volume, leaving an open band at the top that forms the 360º viewing walkway (Skywalk).

New east and west buildings

The West Building houses the new museum area and consists of two new evacuation towers over which a large triangular lattice girder (“Crown”) is placed. From this girder hang the museum beam structure and the façade. It also integrates Presidency areas, Press, Club Offices, evacuation routes, retail and food services, as well as parking and technical areas both underground and at upper levels.

New fixed roof structure

The supporting structure of the fixed roof—which also serves as the running tracks for the retractable roof—is composed of two orthogonal families of lattice girders: two main cable-stayed trusses running East–West and four trusses running North–South that support the edge beams at the ends.

Tubular trusses are fixed to this structure to support the roof envelope.

The entire structure is supported at four points: the two western evacuation towers and two articulated columns on the east side.

Retractable roof

The fixed roof leaves an opening over the pitch that can be closed with a retractable roof supported by 70 m span beams with a depth of 5 m, made of composite materials (fiberglass, carbon fiber, and steel). These beams roll over two of the main trusses until the opening is fully closed, creating a completely weather-protected enclosure.

Between the beams, plastic material cushions are installed; once the beams are extended, these cushions are inflated with air, forming the final surface of the deployed roof.

Key project participants:

Client: REAL MADRID C.F.

Conceptual Design: L35, GMP, Ribas & Ribas

Technical Assistance and Project Management: AYESA; BOVIS-CBRE

Project Management: FCC CONSTRUCCIÓN

Architectural Design: TYPSA

Structural Design: FCC CONSTRUCCIÓN, FHECOR, INES, MC2

Retractable Roof Design: FCC CONSTRUCCIÓN

Façade Design: ARUP

Installations Design: FCC INDUSTRIAL

Construction Company: FCC Construcción

The ACHE Awards will be presented as part of the 9th ACHE Congress, to be held in Granada between June 25 and 27, 2025, where the project will be presented in detail.

Source: *https://x.com/ACHEtweets/status/1934582908565459228/*

21. Data, GIS, and BIM drive transformation in construction

Date: 21/07/2025

Up to a 15% reduction in cost overruns due to construction errors, a 50% reduction in the time required to prepare technical reports, and a 30% decrease in staff travel. These are not figures from a technology company, but the tangible results of applying Geographic Information Systems (GIS) and the BIM methodology on a motorway in Wales built by FCC Construcción.

“Up until about 20 years ago, the sector was among the most lagging—along with agriculture—when it came to digital transformation,” explains José Carlos Rico Pérez, Head of Corporate BIM–GIS at FCC Construcción. The emergence of Building Information Modeling (BIM) has radically changed this reality, becoming the catalyst that has enabled already existing technologies, such as GIS, to finally find their place on construction sites.

The change has not been easy. “There is a significant cultural and generational barrier,” Rico acknowledges, but results are beginning to become evident. According to industry data, tenders with BIM requirements have grown by 30% over the past year, marking a turning point in the adoption of these technologies.

The transformation goes beyond simply introducing digital tools. “In the end, what BIM and GIS—and the combination of both with other new technologies—provide is a 360-degree view of the entire project,” Rico emphasizes. This comprehensive perspective allows multidisciplinary teams to work with real-time, up-to-date information, from design through operation and maintenance of infrastructure.

Cristina Carrera Martínez, Head of Business Development at Esri Spain for the AEC sector (Architecture, Engineering, and Construction), highlights three fundamental pillars that differentiate today’s geospatial platforms: “We are a powerful repository of geospatial information, we have a strong capacity for integration with other systems, and we offer more than 1,600 spatial analysis tools to make the most of that data.”

Real-time impact

Practical case studies demonstrate the real impact of these technologies. At Madrid’s M-30 North Knot, FCC developed a platform that allowed Madrid City Council to communicate traffic detours to citizens in real time by integrating traffic camera feeds. The success was such that the system has since been replicated in part of the A-5

undergrounding project, explains Rico. This system not only improves citizen information but also optimizes internal construction management.

Source: *https://www.larazon.es/economia/datos-gis-bim-aupan-cambio-construccion_20250721687de582abb2960d1faea40b.html*

22. INARTRANS 4.0: un proyecto nacido en PTEC que impul-sa la digitalización de las infraestructuras de transporte

Date: 29/10/2025

The transport infrastructure sector is undergoing a key transformation: technologies such as artificial intelligence, digital twins, and intelligent data management are shaping a new generation of infrastructures that are safer, more efficient, and more sustainable.

In this context, INARTRANS 4.0 emerges—a national R&D project conceived within the Working Groups of PTEC—which has established itself as a benchmark for public–private collaboration under the TransMisiones 2023 program. This ambitious project is funded by CDTI-Innovación through the Science and Innovation Missions, a key instrument for strengthening the technological competitiveness of the sector.

Artificial intelligence as a strategic axis

The objective of INARTRANS 4.0 is clear: to integrate artificial intelligence and advanced data analytics as drivers of informed decision-making throughout the entire life cycle of infrastructure.

The consortium—led by ACCIONA, Indra, Grupo AZVI, and JIG, together with research centers such as CTCON, INTROMAC, TEKNIKER, and the UPM and UAH universities—is currently working on the development of technological solutions applied to:

Predictive models for advanced maintenance

Intelligent decision-support systems for operations

Digital twins for simulation and optimization

Interoperable data management architectures

Data becomes the most valuable asset: its capture, analysis, and exploitation make it possible to anticipate risks, optimize resources, and improve the safety of railway, road, and port infrastructures.

A real example of public–private collaboration

At PTEC, we celebrate that an idea originating in our Working Groups has evolved into a strategic national-level project:

“INARTRANS 4.0 demonstrates that when the construction sector, the technology industry, academia, and public administrations collaborate, we can accelerate the digital transformation that Spain needs.”

Projects like this reinforce PTEC’s mission as a meeting point where ideas and alliances are generated and translated into real innovation with impact and funding.

Smart infrastructure: the future is already underway

INARTRANS 4.0 not only seeks to improve the management of existing assets; it is laying the foundations for a new generation of smart, connected, and resilient infrastructures, ready to address current and future challenges in mobility, sustainability, and competitiveness.

Source: *INARTRANS 4.0: un proyecto nacido en PTEC que impulsa la digitalización de las infraestructuras de transporte*

23. Construcción: big data e IA para evaluar el grado de ejecución y la calidad de una obra

Date: 18/11/2025

In the Smart Construction Manager project, a backpack maps the construction site and a digital twin compares this data with digital plans to generate a report.

A worker walks every inch of a building under construction. This time, they are not carrying tools or materials; instead, they wear a backpack that captures every detail of the spaces they pass through. It is an experimental backpack that records video and captures data using LiDAR, generating a 3D point cloud of each room, wall, ceiling, floor, as well as columns, signage, machinery, scaffolding—and, very importantly, it also detects stains, fractures, or any other imperfections encountered along the way. The idea is to objectively compare what is happening on site—using near real-time captured information—with what was planned: to verify that everything is progressing correctly and to identify what is going wrong.

This experimental backpack, which has already captured data on an FCC construction site and at a health center being built by Becsa, was developed by the Robotics team at the Aragón Institute of Technology (ITA) and is part of the Smart Construction Manager project: a new intelligent and autonomous system for construction site control and management. By applying cutting-edge digitalization technologies to the construction sector, its objective is to improve site management control and the construction materials supply chain.

The next step is to interpret all the information collected by the backpack so that the resulting map can be used to monitor construction progress and execution quality. To this end, ITA's Big Data and Cognitive Systems team has integrated various computer vision algorithms based on artificial intelligence, specifically trained to recognize objects

such as metal profiles for drywall partitions, panels, moisture stains, cracks, and more, and to associate them with specific patterns in the point cloud captured on site. These models have been trained using image datasets provided by companies such as Becsa, FCC, and Placo.

“Everything is integrated into a digital twin that, through different algorithms, objectively evaluates the current state of the project, limiting human intervention to supervision,” explains Francisco Lacueva, from ITA’s Big Data and Cognitive Systems team.

A digital twin

The time comes to compare reality with theory. BIM plans—virtual models shared by architects, engineers, contractors, developers, installers, and designers that include geometric information, materials, costs, schedules, energy efficiency, and more—together with project planning, make it possible to know which elements should have been executed at each point since the start of construction.

The digital twin being developed by ITA’s Digital Transformation and Industrial Processes team compares the data obtained from on-site observation with digital plans (BIM) and project planning in order to automatically generate a report. The report indicates whether construction execution is behind schedule and whether execution quality is adequate, so that if anomalies are detected, they can be corrected before project delivery.

How does this digital twin work? The extracted information is incorporated into the digital twin, which has access to both the BIM plans and the project schedule. Together with other consortium partners, a system has been defined to evaluate potential quality deficiencies in execution. Thus, “the digital twin is not only capable of determining the level of project progress, but also of penalizing elements that do not meet established quality standards,” explains Lacueva. For example, “if visible metal profiles are detected, it is interpreted that the installation of drywall panels is not yet complete. Similarly, the presence of stains or cracks implies the need for rework, which negatively affects the evaluation.”

This approach allows that “if data is captured by an on-site worker, the site manager can carry out the evaluation remotely,” Lacueva highlights, “without the need to physically travel to the site, thereby optimizing time and resources.”

The project completed the second phase of its execution last July. The final phase is currently underway, in which the different algorithms and models developed are being tested and refined. The developments carried out by ITA are being integrated with the platform developed by Signe, CYPE, and TPF. Site visits continue for data capture and platform validation.

The project

Name: Smart Construction Manager. New intelligent and autonomous system for construction site control and management.

Objective: Improve construction site management control and the material supply chain by applying cutting-edge digitalization technologies to the construction sector.

Funding: CDTI CIEN call.

Execution period: From 2024 to 2026.

Consortium: Coordinated by Becsa, S.A., and formed by Signe, S.A., Fomento de Construcciones y Contratas, S.A., TPF Getinsa Euroestudios, S.L., Saint-Gobain Placo, and Cype Ingenieros S.A., with scientific and technological collaborators including the University of Alicante, CETIM, and the Aragón Institute of Technology (ITA).

Robust, interoperable, and field-applicable solutions

Even a sector as “physical” as construction is moving toward digitalization. The main reason, according to Francisco Lacueva from ITA, is “to automate as many tasks as possible in order to focus efforts on those with higher added value.”

Today’s technology enables this. “It allows the capture and generation of large volumes of data that, when properly processed using big data and artificial intelligence tools, enable a wide range of applications,” he explains. These applications range “from controlling access to workers and machinery or tracking the use of personal and collective protective equipment (PPE) to material traceability in a project.” It is also possible to “facilitate access to technical and regulatory documentation applicable at each project stage or, among many other practical cases, to automatically generate project documentation.”

However, a construction site is a complex environment, with many different materials constantly moving and transforming, in a changing space that is literally under construction, which greatly increases the challenges. For Lacueva, the real challenge of a project like Smart Construction Manager is “to demonstrate that technology is capable of helping manage a construction site,” considering that “the sector is highly fragmented, with many subcontractors, and the level of technological expertise among workers is not very high.”

From a technological standpoint, the project faces several major challenges. First, “there is the challenge of integrating data from multiple sources, each with different formats and structures, which requires robust interoperability and standardization solutions.” Second, “as a research project, one of the objectives is to explore the limits of current technology.” As an example, Lacueva notes that “even though examples of quality defects—such as dents in doors—are available to train recognition models, effective detection becomes

difficult if the defect appears in a video frame that was not captured in sufficient detail or at the right moment."

Finally, another key challenge is "ensuring that the technology used for data capture can be operated in real environments by personnel without specialized technical training." This requires designing accessible, intuitive, and robust solutions that can be easily integrated into the everyday workflow of on-site construction workers.

Source: *https://www.heraldo.es/noticias/aragon/2025/11/18/construccion-big-data-ia-evaluar-ejecucion-calidad-obra-ita-1871202.html*

24. “0ACCIDNTES”: Investigación de nuevas tecnologías para la seguridad y salud en la construcción con 0 accidentes

Date: 20/12/2025

Innovation for safety in construction: the 0ACCIDNTES Project

The 0ACCIDNTES project, funded by CDTI and co-financed by ERDF, aims to reduce workplace accidents in construction through Industry 4.0 technologies: advanced sensor systems, artificial intelligence, digital twins, smart PPE, and autonomous robotics.

Testing has been carried out in Madrid at FCC Construcción facilities:

✓ At FCC Construcción’s Central Machinery Park, shared situational awareness was tested. A truck and a fixed infrastructure, both equipped with advanced perception systems (LiDAR, cameras, and GPS), generate a single shared map by fusing their perspectives. This system provides the driver with extended vision and predictive alerts to prevent run-over accidents and improve occupational safety.

✓ At FCC Construcción’s 74-housing construction project in Tres Cantos, the generation of 3D maps using SLAM was validated, along with their conversion into 2D maps for the autonomous navigation of a robot dog tasked with inspecting collective and individual safety elements. In addition, a smart safety harness was tested to ensure correct anchorage of workers to lifelines.

All tests were supported by a datalake, which receives data certified at source through blockchain. From there, an integrated platform can upload and display alerts, as well as visualize all this information within BIM models.

The project is led by FCC Construcción and involved the collaboration of various profiles from the Occupational Health and Safety area during the demonstrations,

contributing their expertise to validate the applicability of the solutions in real environments. In addition, the project includes the participation of partners Becsa, Fractalia, Metálicas Plásticas JAR, Alisys, IDP, Lis Data, and Signe, together with the technology centers ITA, CETIM, and AIMPLAS, as well as the support of the Spanish Construction Technology Platform (PTEC) and the consultancy INCOTEC.

A further step toward safer and more connected construction projects.

Source: *https://www.linkedin.com/posts/fcc-construcci%C3%B3n_0accidntes-investigaci%C3%B3n-de-nuevas-tecnolog%C3%ADas-activity-7399698121666138112-layx?utm_source=share&utm_medium=member_desktop&rcm=ACoAABw5bJcBw_-fMt-ECegGiYLFi7vf1v3zkRU*

Railway Infrastructure

25. They propose manufacturing railway sleepers from recycled plastic to reduce rail emissions

Date: 30/01/2025

“InterActive Pads” has been launched through a request for testing and trials on railway infrastructure in a real-world environment, specifically at Granada railway station.

This technology consists of rail seat pads placed on top of the sleeper to support the rails. These pads incorporate sensors capable of recording vibrations, dynamic loads, and environmental conditions in real time, making it possible to measure railway traffic conditions and train behavior, while also enabling early detection of infrastructure component degradation and failure, prediction of track geometry deterioration, and dynamic weighing of trains, among other key parameters in rail transport.

In addition, the system includes an electronic device capable of transmitting real-time information collected on the dynamic interaction between train and track, thus centralizing knowledge about the condition of both infrastructure and rolling stock.

The tests, carried out on a siding track at Granada station, consisted of replacing a traditional rail seat pad with this new sensorized model and measuring data during the passage of work trains outside commercial service hours. Personnel from the UTE Mantenimiento Antequera–Granada, the company responsible for maintenance of these facilities, participated in the process.

These tests—pioneering in the field of track monitoring using sensorized rail seat pads—will make it possible to assess the system's functionality through full-scale implementation, as a result of collaboration between the University of Granada (UGR) and Adif, thereby strengthening an alliance aimed at the development and application of new technologies aligned with strategies focused on railway efficiency and sustainability through predictive maintenance.

'***Source:*** *https://canal.ugr.es/noticia/sensores-inteligentes-supervisar-en-tiempo-real-el-estado-trenes-y-vias/*

26. The Spanish railway network needs investment in maintenance rather than the construction of new lines

Date: 12/08//2025

Inefficiencies in the transport system are affecting tourism, one of the economic sectors with the greatest weight in the Spanish economy.

The liberalization of passenger rail transport in Spain since 2021 has significantly increased train frequency on the railway network, exposing growing infrastructure problems.

Although Spain has one of the largest high-speed rail networks in the world, several indicators reveal structural deficiencies. In the first quarter of 2025, rail journeys fell by 1.2% year-on-year and by more than 8% compared to the previous quarter, pointing to deep-rooted problems in the system. Experts indicate that the solution lies in strengthening maintenance overseen by Adif, rather than continuing to prioritize the construction of new lines.

The proposed solution is to prioritize the conservation and modernization of existing infrastructure over the construction of new lines, reinforcing Adif's capacity to undertake more effective preventive and corrective maintenance. Furthermore, there is a need to address the structural inefficiencies that affect both system operability and tourism, in order to ensure a more reliable and sustainable service.

Source: *La red ferroviaria española necesita inversiones en mantenimiento y no tanto que se construyan nuevas líneas*

27. Railways as the backbone of future mobility

Date: 16/09/2025

The mobility sector is facing major challenges. The exponential growth in passenger and freight transport, combined with the need to find more sustainable solutions, means that rail is emerging as the main pillar on which to build the future of mobility and continues to be essential for Spain's economy.

Despite the doubts that may arise in times of geopolitical instability, we are witnessing a consolidation of the expansion and modernization of this strategic infrastructure across Europe, which is key to structuring the continent.

Its high competitiveness and sustainable nature compared to other traditional transport models make it indispensable for reducing our dependence on fossil fuels.

Spain maintains a privileged position in the European landscape, as it has the most extensive high-speed rail network, while globally it ranks second after China. It is also among the countries with the largest overall railway networks of various types on the continent.

Rail as the backbone of future sustainable mobility

The mobility sector faces major challenges driven by the growth of passenger and freight transport and the urgent need to adopt sustainable solutions. In this context, rail is consolidating itself as the central pillar for building a more efficient, competitive, and environmentally friendly mobility model—especially in Spain, which has the most extensive high-speed rail network in Europe and the second largest in the world after China.

Despite geopolitical instability, Europe is committed to modernizing and expanding this strategic infrastructure, which is key to the continent's territorial and economic cohesion. Models such as Trainmile's intermodal service, which combines road and rail transport, exemplify this evolution toward faster, more economical, and more sustainable solutions.

Challenges and strategies for a more efficient rail sector

One of the main challenges is avoiding the underutilization of rail transport, which in Spain accounts for barely 4% of freight transport, compared to an EU average of 17%. To reverse this situation, the following are required:

• Continuous investment in infrastructure: track renewal, construction of new lines, and station improvements, aligned with the Ministry of Transport's Indicative Railway Strategy.

• Public–private collaboration: essential for driving digitalization and sustainability. The sector invests 4% of its turnover in R&D and generates more than 30,000 jobs, according to MAFEX.

• Coordination among stakeholders: through action plans and collaborative forums that foster innovative solutions.

• Multimodal integration: facilitating connections between different modes of transport (trains, buses, bicycles, etc.) for a smoother travel experience.

Rail stands out as the collective transport mode with the lowest emissions per passenger, accounting for only 0.5% of total CO_2 emissions from the transport sector.

Digitalization: a driving force for transformation

Digitalization is key to unlocking the full potential of rail. Applied to vehicles and infrastructure, it enables:

• Automation and operational flexibility: thanks to AI, travel times can be reduced, maintenance management improved, and network capacity increased by up to 30%.

• Predictive maintenance: data analysis reduces unplanned stoppages by 30% and maintenance costs by 15%.

• Improved passenger experience: through digital platforms for planning, booking, and managing journeys, as well as advanced connectivity and cloud-based software.

• Rail cybersecurity: essential to protect operations from digital threats through specific regulations, training, and multi-layered security solutions.

A strategic opportunity

Spain has a unique opportunity to lead the transformation of mobility in Europe. With a strategic vision based on innovation, digitalization, sustainability, and collaboration, rail

can become the backbone of a transport system that is safer, more reliable, more affordable, and more environmentally respectful.

Programs such as Horizon Europe, with a budget exceeding €95 billion, provide the ideal framework to drive this transformation.

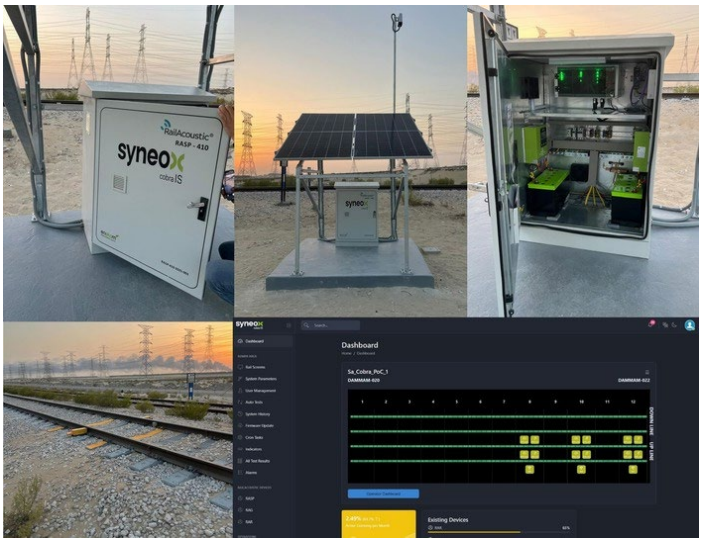
Source: *El ferrocarril como eje vertebrador de la movilidad del futuro*

28. Successful completion of remote monitoring of rail breakage and temperature

Date: 21/09/2025

Syneox Rail has completed the implementation of a 2 km pilot project for the real-time monitoring of rail temperature anomalies, broken rails, flooding, and landslides for the Saudi Railways (SAR) network.

One of the key strengths of the system is its solar-powered energy supply, which was designed to ensure continuous operation even under the harshest desert conditions. The solution incorporates high-efficiency solar panels and robust battery storage to maintain system functionality during nighttime and low-light periods.



Thanks to these features, the system enables proactive risk mitigation and operational safety, even under extreme conditions and regardless of the status of the railway line's power grid.

The successful completion of the project has been officially recognized through the corresponding certification, validating that all work was carried out to the highest standards and in accordance with the requirements specified by Saudi Railways (SAR). This certification marks the formal handover of the system to the client and confirms that all testing and commissioning activities have been successfully completed.

The success of the installation, testing, and achieved results opens the door to large-scale deployment of this system across the SAR network, as well as in other railway

networks seeking to strengthen proactive defect detection and improve the reliability and availability of their infrastructure.

Source: *https://magazine.mafex.es/conclusion-exitosa-de-la-monitorizacion-remota-de-rotura-y-temperatura-de-carril/*

29. Syneox Rail has completed the implementation of a 2 km pilot for real-time monitoring of rail temperature anomalies, broken rails, flooding, and landslides for Saudi Railways (SAR).

Date: 09/2026

One of the key strengths of the system is its solar-powered energy supply, which was designed to ensure continuous operation even under the harshest desert conditions, using high-efficiency panels and robust battery storage to maintain system functionality during nighttime and low-light periods.

Thanks to these features, the system ensures proactive risk mitigation and operational safety, even under the most adverse conditions, regardless of the status of the railway line's power grid.

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Source: *https://magazine.mafex.es/conclusion-exitosa-de-la-monitorizacion-remota-de-rotura-y-temperatura-de-carril/*

30. Integration of graphene in railway sleepers (ADIF–INDRA / Europe's Rail)

Date: 09/10/2025

The IAM4RAIL project, within its Work Package 9 (WP9), includes the development of the "intelligent sleeper" (Intelligent Sleeper)—an advanced solution for the real-time monitoring of railway infrastructure. This sleeper integrates various sensors directly into the concrete to detect structural or environmental issues, such as:

• Rail and ambient temperature,

• Moisture in the ballast,

• Accelerations and inclinations,

• Obstruction by water, mud, or loose materials,

• Acoustic irregularities.

In addition, the project is also developing a research line focused on the incorporation of graphene into the concrete of the sleepers, with the aim of:

• Improving mechanical strength,

• Increasing durability,

• Reducing environmental impact,

• Serving as a foundation for more sustainable infrastructure prepared for future technologies.

Both lines—sensor integration and advanced materials—converge into a more functional and sustainable intelligent sleeper, capable of providing essential data for predictive maintenance, thereby enhancing the safety and efficiency of the railway system.

Source: *https://rail-research.europa.eu/*

31. Neoballast, a sustainable and high-performance solution for railway ballast

Date: 21/09/2025

In a sector increasingly committed to sustainability and efficiency, Neoballast emerges as an innovation that combines technical performance with environmental responsibility. This advanced ballast, coated with a binder and rubber powder from end-of-life tires, improves abrasion resistance and reduces fragmentation, extending its service life without altering the essential properties of traditional ballast, such as permeability or ease of installation. In addition, it allows the thickness of the ballast layer to be reduced by 5 to 8 cm without compromising track stiffness or load-bearing capacity.

Its impact goes beyond performance: Neoballast supports sustainability goals by reducing the extraction of natural aggregates and promoting the reuse of recycled materials, fully integrating the principles of the circular economy.

The coating also helps to limit silica dust emissions and mitigate vibrations, improving safety and health for both workers and the urban environment. Test results support these benefits.

On ADIF's mixed-traffic line between Caldes de Malavella and Maçanet-Massanes (Girona), an average vibration reduction of 6 dB and greater ballast stability were recorded. Another section on Line 5 of the Barcelona metro showed vibration reductions of up to 5 dB within the tunnel and lower degradation over time. Neoballast demonstrates that innovation in railway infrastructure can move toward a more durable, efficient, and environmentally friendly track.

Source: *Magazine MAFEX*

32. Advanced visión fot catenary supervision

Date: 23/11/2025

Catenary supervision is undergoing a profound transformation thanks to the incorporation of computer vision technologies, artificial intelligence (AI), advanced sensor systems, and real-time analysis platforms. These tools allow a shift from sporadic, manual inspections to continuous, automated, and predictive monitoring, capable of reducing costs, minimizing operational risks, and decreasing railway network downtime.

The increase in rail traffic and resource constraints have highlighted the shortcomings of traditional inspection methods, which provide fragmented and low-frequency data. In the current context, infrastructure maintenance requires systems that make it possible to:

Detect failures early, before they evolve into major incidents.

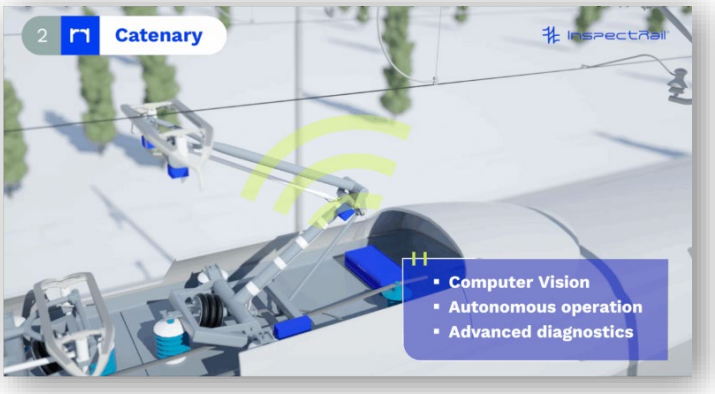
Obtain continuous and accurate information on the condition of assets.

Ensure greater safety and service continuity.

Apply data-driven predictive maintenance, replacing fixed schedules with decisions based on the actual condition of the infrastructure.

Within this need for modernization, the catenary is positioned as one of the most critical elements of the railway system. Its correct operation requires precise and constant control, as manual inspections or sporadic measurements do not allow potential failures to be anticipated properly or responses to be made quickly enough in a high-demand environment.

In this context, the WEARVIS project is framed. Developed under the Hazitek Program and managed by SPRI of the Basque Government, this project drives significant advances in the geometric recording of the catenary and in the automatic detection of anomalies, using AI and computer vision to analyze large volumes of data with greater precision and frequency.



Source: *Visión avanzada para l+a supervisión de la catenaria - Mafex Magazine*

Cybersecurity and permissioned networks for monitorting and control platforms

33. Draft Law on the Coordination and Governance of Cybersecurity set in motion

Date:14/01/2025

The regulation transposes Directive (EU) 2022/2555 of the European Parliament and of the Council (NIS-2) into national law.

The Council of Ministers has approved the draft Law on the Coordination and Governance of Cybersecurity, jointly proposed by the Ministries of the Interior, Defense, and Digital Transformation and Public Service. The regulation transposes Directive (EU) 2022/2555 (NIS-2) into the national legal framework.

The draft law specifies the public and private entities affected by the cybersecurity rules it establishes. It also creates the National Cybersecurity Center, which will be responsible for leadership, promotion, and coordination in this field, ensuring intersectoral and cross-border cooperation with other competent authorities, and acting as the crisis management authority in the event of major incidents.

These entities must belong to sectors considered highly critical for the normal functioning of the country's social and economic life, such as energy, transport, banking and financial markets, the healthcare sector, water, digital infrastructure and technological services, public administration entities, and the nuclear industry.

The draft also includes other less critical sectors, such as postal and courier services; waste management; manufacturing, production, and distribution of chemical substances and mixtures; food production, processing, and distribution; digital service providers; scientific research; and private security.

These entities will be required to carry out an individualized risk assessment and implement a series of actions to guarantee and raise the security levels of their networks and information systems and to prevent the risk of incidents. They will also be obliged to notify significant incidents occurring in their operations or service provision, whether involving their own networks and services or those of external providers. In addition, they must promptly inform service recipients—whether individuals or legal entities—of any significant cyber threat that to serious cyber threats, new challenges, and risks requiring adapted, coordinated, and innovative responses.

The draft law also establishes the role of the Information Security Officer, designated by each entity as the point of contact and technical coordination lead. In essential entities (those most relevant based on their size), the Information Security Officer must obtain accredited personnel status. Specifically, this role will be responsible for drafting and submitting the organization's cybersecurity strategy and policies for approval; supervising and developing their implementation and effectiveness; overseeing compliance with applicable network and information system security regulations; and managing cybersecurity incidents.

Once approved, the future law will incorporate Directive (EU) 2022/2555 (NIS-2) into the Spanish legal system. This directive includes a set of measures aimed at ensuring a high common level of cybersecurity across the European Union.

Accordingly, the Council of Ministers has also approved urgent administrative processing of the draft so that it can be approved by the Government as soon as possible in a second review and immediately enter parliamentary debate. As a result, the Ministry of the Interior intends to promptly notify the European Commission of the approval of this draft, given that the deadline for transposing the NIS-2 Directive into Spanish law expired on 17 October 2024.

may affect them, as well as the measures or solutions that can be applied in response.

It should be noted that the ultimate objective of the draft law is to strengthen the protection of networks and information systems that are now crucial for the development of the vast majority of social and economic activities, and which are subject

Source: *https://www.computerworld.es/*

34. Shadow SaaS expands the attack surface in corporate environments

Date:16/10/2025

The use of unauthorized SaaS applications and the spread of ransomware through collaborative platforms represent critical threats to enterprise security, according to recent studies and alerts from intelligence agencies.

Organizations use an average of 106 SaaS applications, yet 65% of these tools lack formal authorization from the IT department. This proliferation of shadow SaaS creates dangerous blind spots where sensitive data flows through unverified channels, exponentially increasing the corporate attack surface. Recent statistics indicate that 75% of employees are expected to acquire, modify, or create technology without IT oversight by 2027, a significant increase from 41% in 2022.

Economic impact of shadow AI

IBM's recent "Cost of a Data Breach Report 2025" reveals that organizations with high levels of shadow AI face additional costs of USD 670,000 per security breach compared to those with low or no shadow AI usage. This finding places shadow AI among the top three most costly factors in security incidents, surpassing the skills shortage that had dominated previous years.
20% of organizations reported breaches caused by security incidents involving shadow AI, resulting in increased compromise of personally identifiable information (65%) and intellectual property (40%).

Ransomware on collaborative platforms

The cybercriminal group Scattered Spider has intensified its operations by infiltrating collaboration platforms such as Microsoft Teams and Slack to gather internal intelligence and launch highly targeted phishing attacks. According to a joint warning from the FBI and international cybersecurity agencies published in July 2025, the group uses DragonForce ransomware, combined with advanced social engineering techniques, to compromise organizations.

Attackers have developed sophisticated tactics, including impersonating employees to request password resets, "push bombing" attacks through repeated MFA verification requests until approval is obtained, and SIM swapping attacks to intercept one-time password text messages. Scattered Spider has been responsible for attacks against UK retailers such as Marks & Spencer, Co-op, and Harrods, causing estimated damages of £440 million.

Cybercriminals have also implemented extensive reconnaissance techniques, infiltrating corporate teleconferences and incident remediation calls to learn how security teams adapt their defenses. This strategy allows attackers to stay one step ahead, adjusting their techniques to evade detection.

SaaS compromise vectors

The most common AI-related security incidents occurred in the SaaS supply chain, via compromised applications, APIs, or plug-ins, resulting in widespread data compromise (60%) and operational disruption (31%). 29% of organizations reporting AI-related security incidents indicated that the source was a third-party provider delivered as SaaS.

Recommendations

It is recommended to implement phishing-resistant access controls, including multi-factor authentication, maintain offline backups of sensitive data stored separately from source systems, and establish strict AI governance policies. Organizations should prioritize regular audits to detect unauthorized AI, implement rigorous approval processes for AI deployments, and train employees on the risks associated with unsanctioned tools. Continuous monitoring of unauthorized account activity and detection of suspicious login attempts are essential to mitigating these risks.

Source: *https://www.bbc.com/*

35. Spain ranks as the second country with the highest number of cyber threats globally, with phishing attacks standing out

Date:01/07/2025

Spain ranks as the second country worldwide with the highest number of detected cyber threats during the first six months of 2025. Among these, phishing attacks stand out, accounting for nearly 20%, along with a high level of infostealer activity and the rise of social engineering techniques such as ClickFix.

Globally, 5,100 ransomware attacks were identified, involving 96 active groups, resulting in an estimated economic loss of more than $813 million dollars (around €688 million at the current exchange rate).

These findings are detailed in the latest Threat Report H1 2025, prepared by cybersecurity firm ESET, which outlines the threats and trends identified by its telemetry systems worldwide between December 2024 and June 2025.

In this context, Spain ranks second—behind Japan—among the countries most affected by cyber threats, within a landscape where malicious actors have increased both the complexity and volume of ransomware attacks, as well as other types of cyberattacks.

According to Josep Albors, Director of Research and Awareness at ESET Spain, a clear seasonality can be observed in attack patterns, as malicious activity varies depending on Spain's working and holiday calendar.

Significant increases in malicious activity were detected at the start of the Christmas season, while lower activity periods were observed during holiday breaks such as Easter and the May long weekend, when fewer threats were detected. This is largely because users make less use of their IT systems during holiday periods, leading some threat actors—particularly those based in countries following similar religious holiday calendars—to also reduce their activity.

Phishing remains dominant, and new threats such as ClickFix emerge

Phishing continues to be the most commonly used technique for carrying out cyberattacks. This is reflected in the fact that, among the top ten most detected threat types during the first half of 2025, phishing ranks first, accounting for 20% of all registered alerts, far surpassing other threats.

The report also highlights the strong growth of the ClickFix malware distribution technique in Spain, which now represents the second most common attack vector, alongside FakeCaptcha, accounting for 7% of all registered alerts.

This method aims to deceive users through fake system error notifications or CAPTCHA failures—the tests used to distinguish humans from bots. Under the pretext of fixing these issues, cybercriminals attempt to convince users to execute a series of commands, which in reality install malware on their devices.

Infostealer SnakeStealer

Infostealers, or information stealers, are another major threat highlighted in the report. Following the takedown of the well-known infostealer Agent Tesla, which was blocked from its servers, a new replacement has emerged.

This new infostealer is SnakeStealer, also known as Snake Keylogger, which has become the most detected infostealer by ESET in Spain, accounting for 33% of all detections. Spain is now the third country worldwide with the highest number of SnakeStealer detections, behind only Turkey and Japan.

This malware is capable of logging keystrokes, stealing credentials and clipboard data, and capturing screen information. It is typically distributed through email campaigns impersonating official bodies or well-known companies.

Agent Tesla, meanwhile, has dropped to fourth position in Spain, with 5.6% of detections. Other infostealers, such as LummaStealer, remain active, although “it remains to be seen how long it will last.”

RansomHub and DragonForce emerge as new ransomware leaders

Globally, ransomware activity increased by 15% during the first six months of 2025, with 5,100 reported incidents. However, the total value of ransoms paid fell by 35%, reflecting improved defensive measures. These attacks continue to primarily affect small and medium-sized enterprises, with a strong economic and reputational impact.

Specifically, Spain occupies a mid-range position among the top ten countries most affected by ransomware, while neighboring countries such as France and Germany experience a higher number of incidents. The United States remains the most affected country, with more than 1,700 identified attacks.

The report also identifies a shift in ransomware leadership, with groups such as RansomHub and DragonForce replacing LockBit and BlackCat following their recent dismantling.

Source: *España se posiciona como el segundo país con más ciberamenazas a nivel global, destacando los ataques con 'phishing'*

36. No power, no control: real risk for data in a blackout scenario

Date:14/11/2025

On April 28, a massive power outage left much of the Iberian Peninsula without electricity for more than 10 hours. The economic losses were immediate: the estimated impact reached up to **€2 billion in Spain**, with key sectors such as industry, commerce, and logistics brought to a complete standstill. But there is another form of damage—less visible yet equally concerning—that companies are only now beginning to quantify: **data loss**.

According to preliminary estimates, more than **40% of the companies affected by the blackout** experienced some type of incident related to the **integrity or availability of their IT systems**. These ranged from unsaved documents and servers shutting down unexpectedly to database failures or interruptions in digital services. In an increasingly information-dependent world, events like this represent a direct threat to data security and business continuity.

“Many companies realized too late that protecting data is not just about having antivirus software, but about being prepared for the unexpected,” says **Grupo Atico34**, a firm specializing in data protection and regulatory compliance. “A blackout can be both physical and digital. In both cases, the impact can be devastating if there are no prior contingency plans.”

Blackout = Critical risk for data

A power outage of this magnitude exposes **structural weaknesses in information protection**. In fact, a blackout—whether power-related or digital—directly affects data security at least **five critical points**:

• **Failure of security systems:** Many mechanisms that protect IT systems (such as firewalls, active encryption, 2FA authentication, or monitoring tools) depend on a constant power supply. As a result of the blackout, companies such as **Cajamar** experienced difficulties restoring their online banking services.
“We detected multiple companies whose servers went down along with their encryption and access control systems. For hours, their information was literally exposed,” warn experts at Grupo Atico34. “Not due to negligence, but due to the lack of preparation for a prolonged and widespread outage.”

• **Physical access to infrastructure:** Without electricity, electronic access control systems also fail. Magnetic locks, turnstiles, sensors, and alarms become inoperative, leaving doors open to potential intruders.

• **Data loss or corruption:** One of the most common—and serious—risks. Many systems shut down abruptly, without the possibility of securely closing processes. This led to temporary data loss, file corruption, and in some cases physical damage to hard drives

or servers caused by sudden voltage spikes when power was restored. "If you don't have an uninterruptible power supply (UPS) that guarantees several minutes of autonomy, you cannot protect your data against unexpected outages. And those minutes make the difference between preserving or losing critical information," explains Grupo Atico34. "Even worse, some companies did not have up-to-date backups, which further aggravated the consequences."

• **Business continuity breaches:** Without power or connectivity, many companies were unable to meet legal obligations, complete audits, or carry out internal controls. Even temporary disruptions can have **legal and contractual implications**.

• **Opportunity for cybercriminals:** Although no cyberattacks were confirmed during the recent outage in Spain, the possibility of criminals exploiting such scenarios is real and increasingly sophisticated.

NIS2 Directive: more urgent than ever

In this context, the EU NIS2 Directive takes on particular relevance, as it obliges thousands of essential entities—such as energy, healthcare, financial, technological, and transport operators—to raise their cybersecurity resilience standards and implement robust continuity measures.

In Spain, the transposition of this regulation is at an advanced stage and affects more than 30,000 entities, both public and private. Its requirements include the obligation to have contingency plans, carry out periodic risk assessments, and appoint security officers.

“What NIS2 is really seeking is to prevent a blackout or technological incident from turning a company into a hostage of its own vulnerability,” points out Grupo Atico34. “It’s not just about avoiding fines, but about ensuring operational survival in extreme scenarios.”

The directive also establishes significant penalties for entities that fail to adopt adequate security measures and requires serious incidents to be reported within very short timeframes. For many companies, compliance with these obligations will require a fundamental review of their systems from the ground up.

How to mitigate the risk of future blackouts

If the recent incident has made one thing clear, it is that good intentions are not enough. Companies need to implement practical and effective solutions to protect their data against extreme events. Where should they start?

• Assess vulnerabilities: It is essential to conduct an internal audit of weak points in both physical and digital infrastructure. Are UPS systems installed? How much autonomy do they provide? Where are backups hosted? Do access control systems continue to function during a power outage?

• Implement contingency plans: This is not about having a document stored in a drawer, but about having tested protocols that are understood and adopted by the entire organization. Drills and periodic testing are key.

• Appoint a data protection officer: Whether due to legal requirements or strategic choice, having a professional Data Protection Officer (DPO) can make a critical difference. This role coordinates preventive actions, sets priorities, and ensures regulatory compliance in crisis situations.

“Most of the data breaches that occurred during the blackout could have been avoided with measures as simple as having a cloud backup or basic backup power,” concludes Grupo Atico34. “But for that to happen, someone has to think about it beforehand. And that person, ideally, should be a Data Protection Officer.”

• Commit to digital resilience: This means investing in redundant technology, strengthening cybersecurity, and training staff. It is neither a trend nor a bureaucratic requirement—it is an operational necessity for surviva

Source: *https://cybersecuritynews.es*

37. IA dominates the main cybersecurity trends

Date:03/03/2025

The latest Gartner security study predicts that cybersecurity leaders will face this year a mix of challenges and opportunities influenced by the evolution of generative AI, digital decentralization, supply chain interdependencies, regulatory changes, endemic talent shortages, and an ever-evolving threat landscape.

According to Alex Michaels, Senior Principal Analyst at Gartner, security and risk management (SRM) leaders must address this mix with the goal of enabling transformation while integrating resilience.

In his view, leaders' efforts "are crucial to support their organizations' aspirations not only to innovate, but also to ensure that their innovations are secure and sustainable in a rapidly changing digital world."

Generative AI drives data security programs

Most financial resources and security efforts have traditionally been dedicated to protecting structured data, such as databases. However, the rise of general-purpose artificial intelligence has not only transformed data security programs, but has also shifted the focus toward protecting unstructured data, such as text, images, and videos.

According to Michaels, "many organizations have completely redirected their investment strategies, which has significant implications for large language model (LLM) training, data deployment, and inference processes." He adds: "Ultimately, this shift highlights the changing priorities that leaders must address when communicating the impact of generative AI on their programs."

Machine identity management

As a result, the growing adoption of generative AI, cloud services, automation, and DevOps practices has led to intensive use of machine accounts and credentials for both physical devices and software workloads.

If machine identities are neither controlled nor managed, the result can be a significant expansion of an organization's attack surface.

For Gartner, SRM leaders must address the pressure to create a strategy that implements strong machine identity and access management (IAM) to protect against attacks. This effort, however, must be coordinated across the entire organization.

Tactical artificial intelligence

Gartner also argues that hybrid AI implementation has led SRM leaders to reorder their priorities, focusing instead on more specific use cases with directly measurable impacts. In doing so, they seek to align AI practices and tools with existing metrics and integrate them into ongoing initiatives.

This will result in greater visibility into the real value of AI investments, according to the consultancy. In Michaels' opinion, "SRM leaders now have clear responsibilities to secure third-party AI consumption, protect enterprise AI applications, and enhance cybersecurity using AI. By focusing on more tactical improvements with demonstrable benefits, they can minimize risks in their cybersecurity programs and more easily demonstrate progress."

Cybersecurity technology optimization

Given the vast number of vendors in the cybersecurity space, SRM leaders need to optimize their toolsets in order to build more efficient and effective security programs.

As such, Gartner recommends seeking a balance that satisfies procurement teams, security architects, security engineers, and other stakeholders in maintaining an appropriate security posture.

To achieve this, SRM leaders should consolidate and validate basic security controls and focus on architectures that enhance data portability. As support for evaluating advanced needs, threat modeling and organizational technology drivers can also serve as inputs for AI adoption.

Value of cultural programs

Security behavior and culture programs (SBCPs) have reached a tipping point for most organizations. SRM leaders increasingly recognize the value these programs bring in improving cybersecurity posture.

The growing strength of this trend reflects the rising recognition that both good and bad human behavior are critical components of cybersecurity.

As a result, activities focused on culture and behavior have become a prominent approach to addressing awareness and ownership of cyber risk at the human level. This has driven a strategic shift toward embedding security within organizational culture.

Addressing cybersecurity burnout

Gartner also warns about burnout among SRM leaders and security teams, a concern that must be addressed at a critical time for the industry, which is already affected by a systemic shortage of skills.

This widespread stress is driven by the constant demands associated with securing highly complex organizations in ever-changing threat, regulatory, and business environments—often with limited authority, executive support, and resources.

As Michaels cautions, “cybersecurity burnout and its organizational impact must be recognized and addressed to ensure the effectiveness of cybersecurity programs. The most effective SRM leaders not only prioritize managing their own stress, but also invest in team-wide wellbeing initiatives that demonstrably improve personal resilience.”

Source: *https://cybersecuritynews.es/*

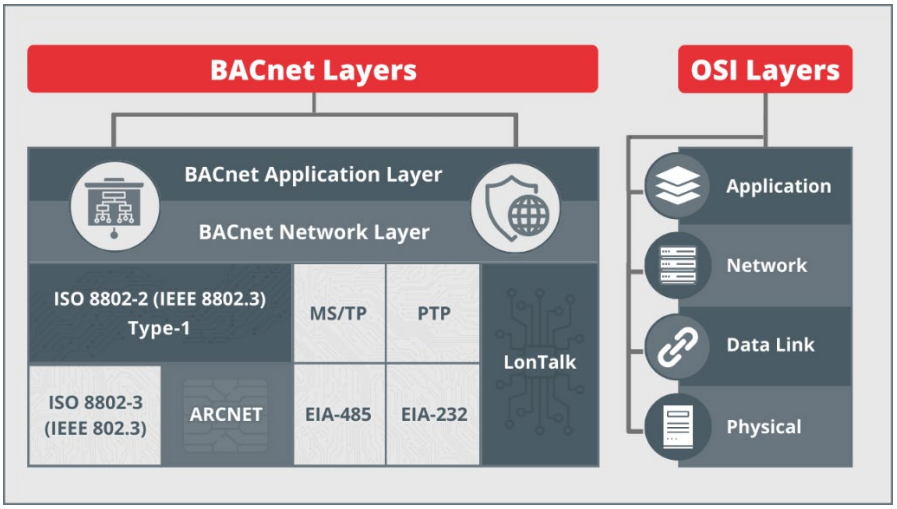

Cybersecurity

38. Understanding BACnet: present and future of the protocol in industrial environments

Date:15/93/2025

Until the arrival of BACnet, there was no standard industrial network protocol for building automation. As a result, controlling different systems such as cooling or HVAC required the use of multiple protocols, which made communication difficult due to the lack of a common standard.

The BACnet protocol was developed by ASHRAE in 1987 with the aim of creating a protocol capable of enabling communication between multiple devices within automation systems. Since its creation, it has steadily gained popularity in the management of smart buildings and has been adopted by many vendors worldwide.



BACnet communication format

One of the main characteristics of this protocol is that it is object-oriented, allowing for a flexible approach. All data is represented in terms of objects, properties, and services.

An object represents information about a physical input or output, or logical groupings of different points that perform a specific function. Each object has an identifier that allows the BACnet system to recognize it.

Properties provide additional information about the object and are essential for successful communication using this protocol. There are three types of properties:

Mandatory properties: Required by the BACnet standard, as they are essential for proper communication. The most notable are object identifier, name, and type.

Optional properties: Not essential for communication but provide additional information about the object.

Proprietary properties: Additional properties created by developers to meet specific needs.

Finally, a service refers to a mechanism that a system uses to access a property or request an action from an object. While many services exist, the only mandatory service that all devices must support is the read service. Services can be grouped into five categories:

Object access: Services used to access and modify object properties.

Alarms and events: Services for obtaining alarms, events, and notifications of value changes.

File transfer: Services used to modify and transfer files stored on devices.

Device management: Services for device discovery, time synchronization, communication control, and device reset.

Network services: Services that manage communication between devices across different network segments.

Architecture

As noted above, BACnet is not designed for transmitting large volumes of data, since it is used to control lighting, HVAC systems, and similar services. It can therefore be considered a lightweight and efficient communication protocol. As a result, its architecture is relatively simple, using only four of the seven OSI model layers, as shown in the BACnet protocol architecture.

BACnet uses the physical, data link, network, and application layers, with the application layer also performing transport and session functions.

Depending on the physical or data link layer used, several BACnet variants exist:

BACnet/IP: Used in VLAN and WAN networks, allowing devices to connect directly to hubs or switches.

BACnet Ethernet: Used on IEEE 802.3 Ethernet networks. Similar to BACnet/IP but uses MAC addresses instead of IP addresses.

BACnet MS/TP: Based on master–slave token passing at the data link layer.

BACnet PTP (Point-to-Point): Used only in telephone networks. Direct EIA-232 connections are generally avoided, with Ethernet being more common.

BACnet over ARCNET: Allows operation over coaxial cable or RS-485 serial cable. Today, it is supported by only a small number of vendors.

BACnet Secure Connect

Due to the rise in cyberattacks affecting the energy sector, the protocol has evolved to improve its cybersecurity level. This evolution is known as BACnet Secure Connect (BACnet/SC).

BACnet/SC introduces a new protocol layer within the BACnet OSI/ISO model, offering full compatibility with BACnet/IP and BACnet MS/TP networks. This version is based on the TLS 1.3 security standard, with optional elliptic curve cryptography of 128 or 256 bits.

BACnet in industrial environments

In recent years, interest in BACnet and its potential implementation in industrial environments has increased, thanks to the many advantages it offers. Some of the key benefits of BACnet in industrial settings include:

Rich data availability: BACnet can provide a wide range of data, such as values, configurations, and alarms, which is highly valuable for decision-making. These capabilities are difficult to find in protocols such as MODBUS, which has more limited data transmission capacity.

Interoperability: BACnet was designed with interoperability in mind, allowing access to each object and its properties and facilitating integration and communication between different systems.

BBMD compatibility: BACnet can work with BBMDs (Broadcast Management Devices), enabling communication between devices on different networks. In contrast, MODBUS lacks this feature and requires manual intervention.

Scalability and adaptability: BACnet is continuously improved, expanding its functionality and adapting to new technologies. This scalability is especially important in growing industrial environments.

Source: *https://cybersecuritynews.es*

Virtual and Augmented Reality for the use of simulators and training

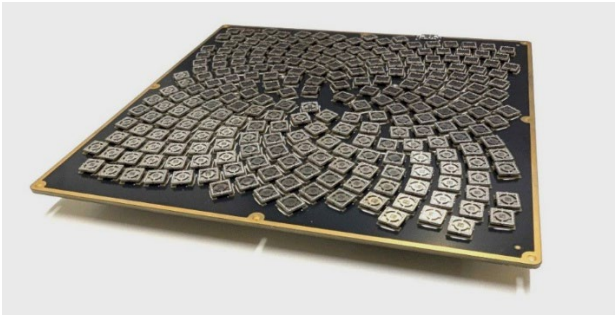
39. Ultraleap announces new developments in microgesture and mid-air haptics technology

Date:09/01/2025

One of the companies present at CES 2025 was Ultraleap, where it showcased two major innovations: the world's first development kit combining Prophesee's GENX320 sensor with advanced microgesture technology through the Helios SDK, and its second-generation transducer, featuring improved capability to transmit mid-air haptic sensations.

Helios is designed for use in AR or smart glasses, combining event-based vision detection with hand-based microgesture recognition technology. Its design has been developed around Prophesee's GENX320 sensor, which can be easily integrated into this type of device.

As for the second-generation transducer, its reference design is now 50% smaller, while achieving 30% higher pressure output, enabling the transmission of tactile sensations in mid-air without the user needing to touch any surface. Among its future use cases are contactless biometric palm readers, interfaces for autonomous vehicles, and enhanced immersion in XR experiences.



En cuanto a su Transductor de segunda generación, su diseño de referencia es ahora es un 50% más pequeño, pero es capaz de lograr una salida de presión un 30 % mayor,

Source: *https://www.realovirtual.com/*

40. First technical details of Horizon Engine, Meta´s metaverse engine

Date:09/01/2025

Briefly presented at the latest **Meta Connect** alongside **Meta Studio**, the developer blog has published a post with the first technical details of **Meta Horizon Engine**, the new tool designed to drive the creation of larger and more visually impactful worlds within the company's metaverse initiative: **Worlds**.

Features:

Scalability from cloud to mobile devices:

The engine automatically scales from high-end cloud rendering to execution on mobile phones. It supports large numbers of live avatars in a single shared space, expansive environments that can be streamed as sublevels, and automatic object quality management through automatically generated levels of detail.

Speed and performance:

Worlds load and run quickly, whether users are multitasking in Horizon OS, exploring new worlds with friends on Meta Quest, or playing games on their phone.

Familiar tools:

The engine is compatible with formats developers already know. It incorporates powerful composition primitives—such as templates, inheritance, and overrides—to streamline world creation and customization.

Platform evolution:

The engine is designed to provide a technical foundation that can grow and evolve over time without requiring constant updates to already published content. It was also designed from the ground up with user security in mind.

Technical details:

Assets:

A robust, data-driven, creator-controlled asset pipeline that supports modern local workflows with standard tools and familiar middleware such as PopcornFX for effects, MOD for audio, Noesis for UI, and PhysX for physics.

Audio:

A spatialized audio system that combines experiential sound, immersive media formats, and hybrid VoIP into a single immersive experience.

Avatars:

First-class integration of Meta Avatars, providing consistent embodiment and interaction behavior across the platform, as well as crowd systems across networked instances.

Networking:

A secure and scalable actor-based network topology that enables low-latency, player-predicted interactions with server validation and creator-defined network components.

Rendering:

An advanced mobile and VR renderer featuring physically based shading, an integrated light baker, probe-defined lighting for dynamic objects, and a creator-defined material framework through a powerful, extensible, and stackable surface shading system.

Resource management:

A resource manager, streaming system, and multi-process task scheduling framework to maintain user experience by balancing quality and cost within the variable performance limits of Quest and other platforms.

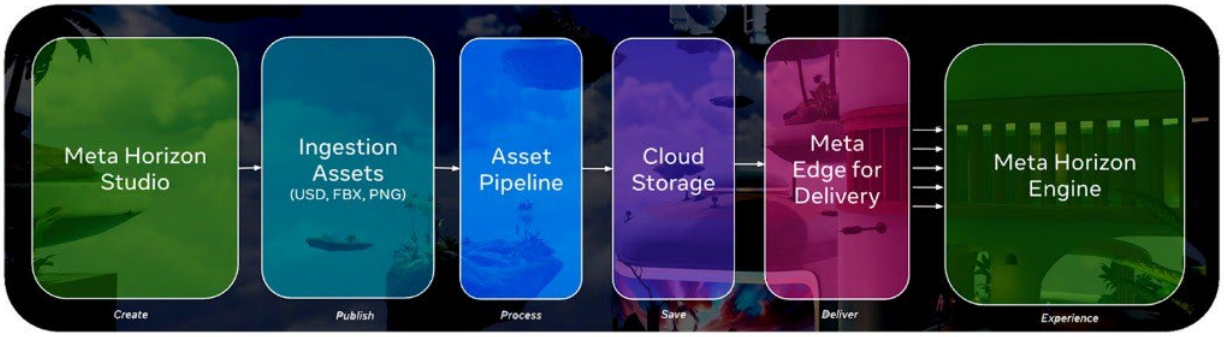
Scripting:

An extensible TypeScript-based creation environment to unify logic and control world flow, with creator-defined components and clear entity life cycles.

Simulation:

A data-oriented ECS-based simulation system capable of efficiently simulating millions of networked entities.

Meta states that developing this new engine is a highly ambitious initiative that has required significant long-term investment. Its goal is to establish a new benchmark for social, persistent, and cross-platform experiences. To achieve this, the engine has been built on a stack of high-performance, data-oriented, modular runtime capabilities designed to work seamlessly together



Source: *https://www.realovirtual.com*

41. Varjo y REISER dan un paso más en la formación virtual de pilotos de helicópteros

Date:18/11/2025

La formación de pilotos de helicópteros, sin haberse montado en ninguno, marcará un nuevo hito cuando el simulador de realidad mixta REISER H145 D3, en el que se emplean visores XR-4 de Varjo, sea aprobado por la Oficina Federal de Aviación de Alemania (Luftfahrt-Bundesamt, LBA) bajo el marco de condiciones establecidas por la Agencia Europea de Seguridad Aérea (EASA).

Este simulador cuenta con una cabina háptica a escala real y dos estaciones de tripulación XR totalmente instrumentadas, lo que permite una formación de tripulaciones múltiples altamente realista. Los pilotos pueden practicar procedimientos operativos estándar, gestión de recursos de la tripulación, flujos de verificación y comprobaciones cruzadas mutuas en entornos totalmente inmersivos.

El simulador XR de REISER está integrado con XR-4 de Varjo, diseñados específicamente para entrenamiento en misiones críticas. Juntos, estamos impulsando un salto fundamental en la formación de pilotos hacia entornos virtuales y nos enorgullece colaborar con REISER para fomentar la adopción de dispositivos de entrenamiento de simulación de vuelo (FSTD) cualificados basados en realidad mixta", dice Valentin Storz, director de ingresos de Varjo

El simulador H145 D3 XR ya cuenta con la precalificación de Dispositivo de Entrenamiento de Vuelo Nivel 3 (FTD-3). La certificación completa se obtendrá tras completar el proceso de cualificación de Operador de Dispositivos de Entrenamiento de Simulación de Vuelo (FSTDO) a principios de 2026.

Source: *https://www.realovirtual.com/*

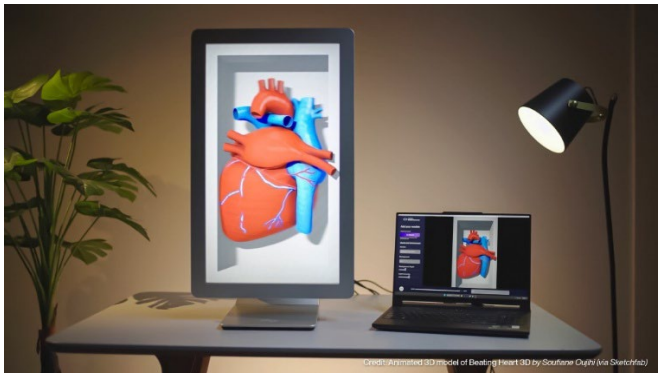
42. Looking Glass de 27”: imágenes 3D para múltiples usuarios sin necesidad de gafas o visor

Source:22/04/2025

Admirar imágenes 3D en calidad 5K en una pantalla de 27 pulgadas sin necesidad de usar gafas o visores por varias personas desde distintos ángulos ya es posible con el nuevo modelo de la compañía Looking Glass, especializada en pantallas de campo de luz.

Características:

- Proyección de 45 a 100 perspectivas simultáneamente, creando un efecto 3D impecable dentro de un cono de visión de 53°
- Imágenes de calidad 5K y vídeos holográfico
- Las imágenes y aplicaciones 3D interactivas pueden ser vistas por varias personas al mismo tiempo
- Pantalla de 1 pulgada de grosor capaz de mostrar imágenes 3D de 16 pulgadas de profundidad
- Compatible con Unity e integración con WebXR
- Los contenidos pueden ser enviados desde un iPad
- Montaje VESA flexible o soporte de escritorio, con dos orientaciones diferentes (vertical y horizontal)



Source: *https://www.realovirtual.com*

43. AltspaceVR will return as an open-source platform

Date:30/04/2025

The social platform **AltspaceVR** will be revived after having been shut down by Microsoft two years ago. The revival comes from **Danny Mac**, who has recovered the brand and founded a company dedicated to “bringing back this incredible community space and ensuring its continuity.”

AltspaceVR was originally launched in **2013** through crowdfunding and was a pioneering social application that enabled virtual worlds where users could meet friends or hold work meetings. This early form of the “metaverse” failed to attract a sufficient user base, and its closure was announced in **2017**.

Microsoft then stepped in to rescue the platform, expanding it as part of its strategy around Windows Mixed Reality. However, the gradual loss of interest in XR by the company led by Satya Nadella resulted in the platform’s closure on March 10, 2023.

AltspaceVR is now being rebuilt as an open-source platform through BasisVR, with the intention of it not being a product or a business, but rather a meeting place for community and creativity—a safe, non-toxic space where worlds can thrive “without shady monetization or ads that ruin the atmosphere.”

Source: *https://www.reddit.com/r/AltspaceVR/*

44. Meta provides more information about its EMG wrist device

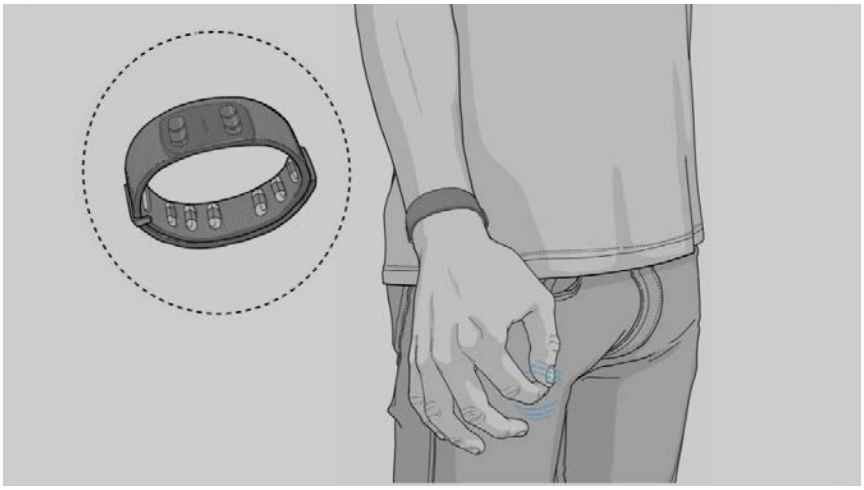
Date:10/01/2025

One of the technologies aiming to revolutionize how we control electronic devices is surface electromyography (EMG), which Meta introduced in the form of a wrist-band alongside the Orion AR glasses prototype.

sEMG_121924_final-2.pdf

Beyond making the “next generation of computing” take the form of lightweight AR glasses that people actually want to wear, another major challenge is how users will control these devices—beyond eye tracking, hand tracking, voice commands, or small buttons and touch-sensitive surfaces.

The proposed solution is a wrist-worn device capable of interpreting muscle electrical signals instantly and on the fly, almost as if the user were simply thinking about the gesture they want to perform.



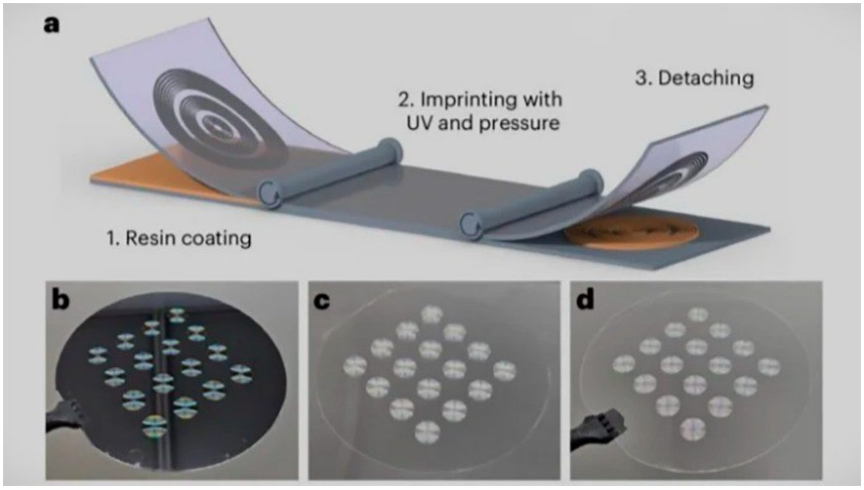
EMG technology operates at the periphery: it does not rely on detecting neural signals from the brain, as is the case with brain–computer interfaces (BCI)—an area that Valve has shown interest in, although such technology currently seems difficult to integrate into a commercial XR headset.

Source: *https://www.meta.com/es-es/blog/*

45. Samsung logra un gran avance en metalentes acromáticas para dispositivos XR

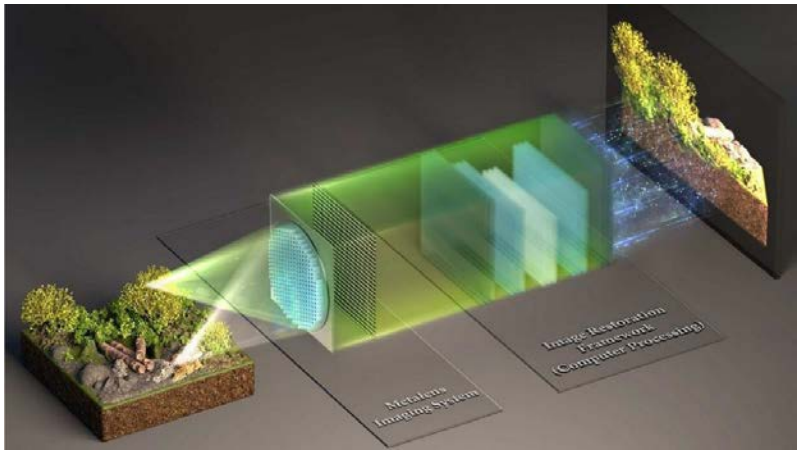
Date:26/02/2025

Samsung Electronics, together with Pohang University of Science and Technology (South Korea), has published a research paper on advances in the development of metalenses for future use in optical systems and XR devices. These lenses are extremely thin and allow for wide fields of view.

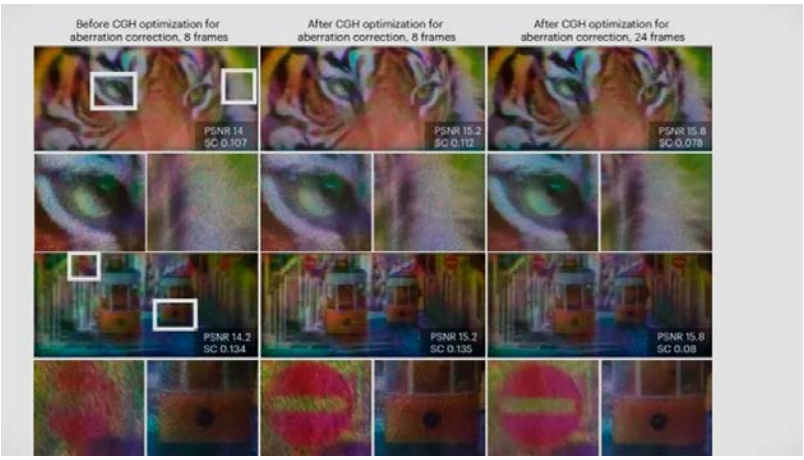


The paper “Printable roll-to-plate RGB achromatic metalenses for near-eye wide field-of-view holographic displays,” published in the academic journal Nature Materials, explains how a team of researchers successfully developed a color-distortion-free achromatic metalens and combined it with holographic displays.

A metalens is a flat lens composed of nanometer-scale structures capable of controlling light diffraction. This allows for a drastic reduction in weight, size, and thickness compared to traditional convex optical lenses—down to less than 0.5 mm.



One of the main challenges of metalenses has been the appearance of unwanted color fringes and severe chromatic aberrations. The research team solved this problem by **designing and fabricating all layers simultaneously**, rather than assembling them individually.



The combination of these **achromatic metalenses with holographic displays** could represent Samsung's future path toward the production of **compact, high-quality holographic XR wearables**, as well as advanced immersive multimedia devices and other optical systems.

Source: *https://news.samsung.com/*

Artificial Intelligence

46. UNE launches the first global standard on artificial intelligence management in Spanish

Date:26/02/2025

The Spanish Association for Standardization (UNE) has published in Spanish the first international standard on artificial intelligence management systems, titled UNE-ISO/IEC 42001:2025. Aimed at all types of organizations, this standard establishes the requirements to implement and continually improve an AI management system, ensuring transparency, ethics, governance, and security.

The standard provides a systematic framework to address key aspects such as privacy, cybersecurity, human rights, accessibility, and financial impacts. It is designed to strengthen trust, facilitate regulatory compliance, improve decision-making, and is certifiable by independent bodies.

More than 130 experts from 58 entities participated in its development through the UNE CTN 71/SC 42 committee on artificial intelligence and big data.

The need for standards in the AI era

Today, AI is no longer a promise of the future—it is a present reality across all sectors. From healthcare to finance, from education to industry, algorithms are making decisions that directly affect people's lives. While the benefits are immense, so are the risks if AI is not managed rigorously. Algorithmic bias, lack of transparency, impacts on employment, privacy issues, unauthorized use of personal data, and automated discrimination are just some of the ethical and social challenges posed by its use.

In this context, having a standard such as UNE-ISO/IEC 42001:2025 enables organizations to move forward with confidence in deploying AI systems, ensuring that they do so safely, ethically, responsibly, and with guarantees for all stakeholders involved.

Source: *https://unaaldia.hispasec.com/2025/07/une-lanza-en-espanol-el-primer-estandar-global-sobre-gestion-de-la-inteligencia-artificial.html*

47. Use of AI in North Korea to forge military identities and launch attacks

Date:16/09/2025

A report by the South Korean company **Genians** reveals how the **Kimsuky group**, linked to the Pyongyang regime, is using **artificial intelligence tools** to create fake military credentials and develop advanced phishing campaigns.

In 2025, artificial intelligence has moved beyond being just a tool for productivity or innovation and has also become an offensive weapon in the hands of malicious actors. The Kimsuky group, known for its cyber-espionage operations and closely tied to the North Korean regime, has been identified as responsible for a new wave of attacks in which AI plays a central role.

According to the South Korean cybersecurity firm Genians, attackers have used platforms such as ChatGPT to generate fake South Korean military identification documents. These deepfake documents were incorporated into phishing campaigns that impersonated official sources, significantly increasing the credibility of malicious emails distributing malware.

AI as an infiltration tool

Kimsuky's use of artificial intelligence is not limited to generating fake documents. Additional research indicates that the group has also relied on other models, such as Claude (by Anthropic), to create fake résumés, build convincing digital profiles, and even pass coding tests during recruitment processes. The goal: to infiltrate foreign companies and gain access to sensitive information.

Experts warn that these practices demonstrate cyber attackers' ability to bypass security filters in AI tools through prompt-engineering techniques that disguise malicious requests as harmless or educational.

Global implications

This case reflects a worrying trend: the consolidation of AI as a threat multiplier in cybersecurity, capable of automating tasks, refining attacks, and rapidly scaling campaigns. For many specialists, this evolution marks the beginning of a new phase in cybersecurity, where the boundary between human-driven and automated attacks becomes increasingly blurred.

Source: *https://unaaldia.hispasec.com/2025/09/corea-del-norte-usa-ia-para-falsificar-identidades-militares-y-lanzar-ataques.html*

48. OpenAI to reléase an open AI model to compete with llama and RI

Date:01/04/ 2025

CEO Sam Altman announced that OpenAI will release an “open-weight” AI model in the coming months. “We’re excited to release, in the next few months, a new and powerful open-weight reasoning language model,” the executive posted on X.

The decision comes in response to the overwhelming success of DeepSeek’s R1 model, developed by the Chinese company DeepSeek, as well as the popularity of Meta’s Llama models.

What does “open model” mean in AI?

Shortly after the launch of DeepSeek’s model in January, Altman stated that his company had been “on the wrong side of history” regarding open models, signaling a likely change in direction. Earlier this week, he reiterated that OpenAI had been considering releasing an open-weight model for some time, adding: “Now it feels important to do so.”

Currently, OpenAI makes its AI available via a chatbot and through the cloud. In contrast, R1, Llama, and other open-weight models can be downloaded for free and modified. A model’s “weights” refer to the values within a large neural network, which are set during training. Open-weight models are cheaper to deploy and can also be adapted for sensitive use cases, such as handling highly confidential information.

OpenAI may feel the need to demonstrate that it can train a new model at low cost, as DeepSeek’s model was reportedly trained at a fraction of the cost of most large generative models. “This is incredible news. With DeepSeek, everyone is realizing the power of open weights,” told Clement Delangue, co-founder and CEO of Hugging Face, to *WIRED*. Meanwhile, Steven Heidel, a member of OpenAI’s technical staff, reshared Altman’s announcement and added: “This year we’ll release a model you’ll be able to run on your own hardware.”

Johannes Heidecke, an AI safety researcher at OpenAI, also echoed the message on X, suggesting that the company will carry out “rigorous testing to ensure the open-weight model cannot be easily misused.” Some AI researchers worry that open-weight models could enable criminals to launch cyberattacks or even develop biological or chemical weapons. “While open models pose unique challenges, we’re guided by our Preparedness Framework and won’t release models we believe pose catastrophic risks,” Heidecke wrote.

OpenAI has also launched a web page inviting developers to apply for early access to the upcoming model. Altman confirmed that the company will host developer events featuring early prototypes of the new model in the coming weeks.

Meta was the first major AI company to adopt a more open approach, releasing the first version of Llama in July 2023. Today, there is a growing number of open AI models.

However, some researchers argue that Llama and similar models are not as transparent as they appear, since their training data and other key details remain undisclosed. Meta also enforces a license that limits other companies' ability to profit from applications and tools built with Llama.

Source: *https://es.wired.com/articulos/openai-lanzara-un-modelo-abierto-de-ia-que-competira-contra-llama-y-r1*

49. AI agents grow by 119% in the first half of 2025

Date:19/09/ 2025

A new Salesforce report, the Agentic Enterprise Index, leverages usage data from Agentforce to provide an initial view of the trends shaping the agentic enterprise and how companies are implementing AI agents to drive customer success and reinvent their businesses.

The agentic enterprise represents a fundamental shift in how the business world operates. It leverages AI agents not only to automate existing workflows, but to transform entire businesses. By equipping every employee with an unlimited digital workforce, organizations can increase productivity and scale, improve employee experience, reduce costs, and deliver greater value to customers.

The Agentic Enterprise Index reveals that this transformation is already underway and that AI agents are having a significant impact on companies across areas such as sales, service, and internal operations. The creation of agents among companies leading this transformation increased by 119% between January and June 2025, and the average number of agent-led customer service conversations was multiplied by 22 during this period. Consumer-facing industries—such as financial services, travel and hospitality, and retail—are leading the adoption of AI agents, with sales and customer service being the most common use cases.

The report also highlights growing adoption among employees. Employee interactions with AI agents grew at an average monthly rate of 65% during the first half of 2025. In addition, employees are engaging in longer conversations with AI agents; actions taken by agents as a result of employee interactions grew at an average monthly rate of 76% over the same period.

Consumers are also enthusiastically embracing AI agents, with 94% choosing to interact with them when given the option. However, this does not mean humans are being side-lined. Companies are balancing human and agent capabilities so that AI agents handle initial contact and common queries, while human agents focus on more complex issues. In fact, escalations to human agents increased from 22% in Q1 2025 to 32% in Q2 2025, as agents improved their ability to recognize when human intervention was needed and route customers to the appropriate experts.

Source: *https://aitalks.es/los-agentes-ia-crecen-un-119-en-la-primera-mitad-de-2025/*

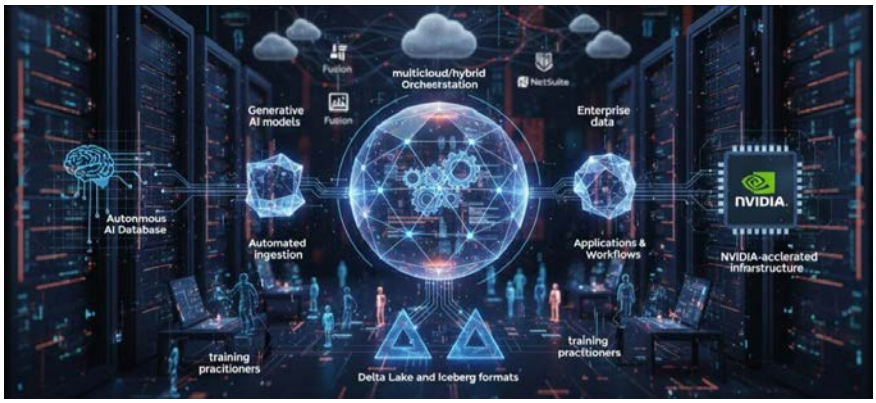
50. Oracle launches its AI Data Platform, empowering customers to innovate in the era of artificial intelligence

Date:14/10/ 2025

Oracle has announced the general availability of Oracle AI Data Platform, a comprehensive platform designed to help customers securely connect the most advanced generative AI models with their data, applications, and enterprise workflows. By combining automated data ingestion, semantic enrichment, and vector indexing with built-in generative AI tools, Oracle AI Data Platform simplifies the entire process—from raw data to production-ready AI solutions.

Oracle AI Data Platform prepares data for artificial intelligence and enables the creation and deployment of agent-based applications by combining the capabilities of Oracle Cloud Infrastructure (OCI), Oracle Autonomous AI Database, and the OCI Generative AI service. Business users gain access to reliable real-time insights and AI agents that automate routine tasks, identify growth opportunities, and embed intelligence directly into daily workflows. Developers and data teams, in turn, benefit from a single, enterprise-grade platform to quickly build and scale these solutions.

The platform integrates NVIDIA's accelerated computing infrastructure, allowing customers to select the latest-generation GPUs and libraries for high-performance workloads. The result is faster innovation, higher productivity, and tangible business impact across all areas of the organization.



"Oracle AI Data Platform permite a los clientes preparar sus datos para la inteligencia artificial y, a continuación, aprovechar la IA para transformar todos los procesos empresariales", señaló T.K. Anand, vicepresidente ejecutivo de Oracle. "Al unificar los datos y simplificar todo el ciclo de vida de la inteligencia artificial, Oracle AI Data Platform se

"Oracle AI Data Platform enables customers to prepare their data for AI and then leverage AI to transform every business process," said T.K. Anand, Executive Vice President at Oracle. "By unifying data and simplifying the entire AI lifecycle, Oracle AI Data Platform

becomes the most comprehensive foundation for enterprises looking to harness the power of AI with confidence, security, and agility."

Oracle AI Data Platform provides a robust enterprise foundation for data and artificial intelligence. Customers can build their own data lakehouse using open formats such as Delta Lake and Iceberg, helping to eliminate data duplication. In addition, the AI Data Platform catalog delivers a unified view and comprehensive governance of all data and AI assets, helping organizations maintain trust and regulatory compliance. The catalog also supports a wide range of AI agents and tools based on open standards such as Agent2Agent (A2A) and Model Context Protocol (MCP), enabling customers to create advanced multi-agent systems. Finally, business users benefit from the Agent Hub, which simplifies interaction with multiple agents by interpreting requests, invoking the appropriate agents, presenting recommendations, and enabling immediate action.

Oracle AI Data Platform enables customers to:

Turn data into intelligence: Transform raw data into actionable insights and smarter decisions by unifying the data lakehouse and AI in a single platform.

Accelerate innovation across teams: Provide a shared workspace for data engineers, data scientists, and AI developers, fostering collaboration and the creation of AI-powered applications.

Automate and scale business processes: Move beyond analytics with AI agents that orchestrate workflows, trigger alerts, and improve efficiency to generate direct business outcomes.

Be enterprise-ready from day one: Deliver the scale, performance, and reliability required to adopt AI in mission-critical environments, combining the power of OCI, open-source engines, industry-leading analytics, and the Oracle Autonomous AI Lakehouse.

With Zero-ETL and Zero Copy capabilities, customers can seamlessly access critical data from enterprise applications—such as finance, human resources, supply chain, marketing, sales, or customer service—as well as information from existing industry-specific applications and corporate databases. Oracle AI Data Platform supports

orchestration across multicloud and hybrid environments, enabling data connection, processing, and analysis from any environment: public cloud, on-premises infrastructure, or edge environments. In addition, AI agents can operate seamlessly across both Oracle applications and third-party solutions, allowing organizations to scale AI-driven innovation across the entire business.

For all its major application suites—including Oracle Fusion, NetSuite, and industry-specific solutions such as healthcare, consumer goods, financial services, or construction—Oracle plans to offer a tailored version of AI Data Platform with preconfigured integrations. Furthermore, curated, enriched, and AI-ready data from Oracle Fusion Data Intelligence will be available directly within the platform, delivering immediate value to business users.

Source: *https://aitalks.es/oracle-presenta-su-plataforma-de-datos-con-ia-que-impulsa-a-los-clientes-a-innovar-en-la-era-de-la-inteligencia-artificial/*

51. AI and digital twins: why does industry need powerful local infrastructures?

Date:09/10/2025

The acceleration of artificial intelligence (AI) in industry depends on adapted hardware and software infrastructures capable of supporting massive computing workloads locally, in real time, and with absolute reliability. In this context, the centralized cloud model—although ubiquitous—reveals its limitations and cannot, on its own, meet the operational and regulatory requirements of industry. As a result, local infrastructures are once again at the heart of industrial AI deployment strategies.

Latency, confidentiality, sovereignty: decisive criteria

AI integrates almost naturally into industrial processes. In use cases such as vision-assisted quality control, intelligent robotics, or predictive maintenance, excessive latency can compromise the accuracy of automated decisions and even generate operational risks.

Beyond technical aspects, strict regulatory requirements regarding security and confidentiality force industrial companies to maintain full control over their data flows. In strategic sectors such as healthcare, defense, or energy, outsourcing data to public clouds—often subject to extraterritorial jurisdictions—is not a viable option. Local infrastructures make it possible to retain full data control while ensuring compliance with local security regulations.

Digital twins: convergence of simulation, AI, and edge computing

The rise of digital twins perfectly illustrates this need for local processing power. A McKinsey survey showed that 86% of industrial executives identify concrete applications for digital twin implementation within their organizations, and nearly half have already started deployment. These virtual environments make it possible to simulate production chains, predict failures, and optimize the maintenance of complex systems.

However, this transformation is only possible thanks to high-performance local infrastructures, which ensure real-time consistency and reduce the risks associated with outsourcing processing. To guarantee seamless interaction between simulation and reality, processing must take place where data is generated: at the edge or in local data centers close to production.

A hybrid architecture: local datacenter, edge, and distributed AI

Industrial AI is evolving toward hybrid architectures that combine local data centers, edge computing, and distributed AI. This convergence enables intelligent, secure, and real-time processing of industrial data.

Faced with growing needs for flexibility, agility, and sovereignty, infrastructures must become smarter and capable of evolving rapidly. Companies rely on an ecosystem that

manages computing resources, integrates with open-source environments, and adapts to the specific characteristics of each industrial site.

Controlling infrastructure to control AI

For years, the public cloud was presented as the ideal solution for running AI models, but its limitations are evident in critical industrial applications. Hybrid architectures—combining local data centers, edge computing, and distributed AI—enable real-time data processing while maintaining control over information flows.

Edge computing plays a key role by allowing companies to process data where it is generated, optimizing resources and reducing dependence on centralized solutions. These technologies are being widely adopted to accelerate AI workloads. According to an IDC study sponsored by NVIDIA, companies are investing heavily in GPU-accelerated servers to meet growing AI demands. Global investment in GPU servers increased from $6.9 billion in 2020 to $10.3 billion in 2022. The current challenge for industry is to build infrastructures capable of fully exploiting AI's potential while maintaining complete control over data and processes.

Building the foundations of sovereign, scalable, and resilient AI

The future of AI, as currently envisioned, will be neither entirely cloud-based nor entirely on-premise. It will be hybrid, combining the power of local data centers, the proximity of edge computing, and the agility of the cloud. For the most advanced industrial players, it is essential to work with trusted technology partners who bring software expertise and deep knowledge of industrial environments, and who offer architectures adapted to multiple scenarios: traditional data centers, edge micro-data centers, or embedded modular infrastructures. In this way, industrial companies gain strategic support aligned with their requirements for flexibility, security, and scalability

Source: *https://aitalks.es/*

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