Isdefe

PLENARY 2024

HORIZONS NETWORK

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INTRODUCTION

Introduction

Horizons Network is the vehicle articulating Isdefe's foresight and technology watch activities. Since its creation in 2016, its goal has been to detect future trends in Isdefe's areas of interest in order to train its staff and respond in the best possible way to the challenges facing the **Public Administation.**

Currently **Horizons Network** is made up of six observatories through chairs and agreements with universities, research centers and organizations of interest:

- Defense and Security Observatory
- Systems Engineering and Programme Management Observatory
- Transport Observatory
- Space Observatory
- Information and Communications Technology (ICT) Observatory
- Energy Observatory

The activity of the **Horizons Network** is focused on:

- Developing foresight activities and technological, methodological and management analysis.
- Building a network of experts in domains of strategic interest for the Spanish Public Administration
- Disseminating the knowledge generated through publications, conferences, and seminars.
- Attracting talent from the universities and organizations participating in the Network.

Horizons Network is a relevant actor in the Spanish Defense Innovation Ecosystem. To this end, it maintains a close relationship with all its participants, including the main R&D organizations in the Spanish Ministry of Defense.

With this initiative, **Isdefe** is committed to open innovation in the **Public Administration.**

OPENING

Opening

Isdefe holds a plenary session each year to disseminate the knowledge generated by the **Horizons Network.** In 2024, the theme selected was foresight in the AGE. The company's CEO, **Francisco Quereda Rubio,** opened the conference by recalling the main objective of this initiative: **"To serve as a foresight tool for the Ministry of Defense and the Spanish Public Administration".**

Francisco Quereda Rubio

CEO at Isdefe

Quereda continued his speech by stressing that "foresight is closely linked to innovation, and at Isdefe, we have always defended that innovation is an obligation".

"A solid commitment to innovation and foresight allows us to be competitive and position ourselves as leaders capable of anticipating and shaping the future," he concluded.

Ildefonso Vera Gómez

Director of Innovation, Processes and Digital Transformation at Isdefe

Isdefe's Director of Innovation, Processes and Digital Transformation, Ildefonso Vera Gómez, then presented the event's agenda, evoking the nature of man who, throughout history, "has always wanted to know what the future will be like in order to anticipate risks and take advantage of opportunities."

Isdefe's response is its Horizons Network, which "aligns innovation and technological development with ethical, social and sustainable objectives.

Jesús Alonso Martín

Director of Business Development at Isdefe

The opening concluded with a speech by Isdefe's Director of Business Development, Jesús Alonso Martín, who emphasized the "watchdog" role that the Horizons Network must play in "anticipating changes that could affect the environment of Defense, the University and the Spanish Public Administration".

Finally, he stressed the importance of this annual plenary to "promote collaborative work, knowledge transfer and create synergies".

PRESENTATION OF PROSPECTIVE

Presentation of prospective reports

The **2024 Plenary of the Horizons Network** was chosen by Isdefe to present the prospective reports prepared by the seven chairs. Based on the current situation, the studies proposed future trends and scenarios in their respective areas of research.

Thanks to these prospective reports, the **Horizons Network** helps the Spanish Public Administration to:

- Reduce uncertainty by evaluating future scenarios based on systematic and structured analysis.
- Improve the ability of organizations to adapt to a changing environment, ensuring resilience in the face of disruptions.
- Reduce knowledge gaps and equip talent for future scenarios.

Defense and Security Observatory

Defense and Security Chair

Mateo Burgos García, professor at the Higher Technical School of Telecommunication Engineering (ETSIT) of the Universidad Politécnica of Madrid (UPM) and director of the Chair of Defense and Security, has presented the first conclusions of his prospective report, which is based on a bibliometric study and the recognition of influencing factors.

The bibliometric analysis was based on natural language processing tools in the context of the ASSET+ project and consisted of the evaluation of more than 500,000 documents to identify the technologies most present in this type of literature based on four factors: geopolitical, economic, regulatory and technological.

The result has yielded four possible scenarios:

Massive drone strikes: These do not require large resources and are already being carried out in current conflicts with technologies such as automatic response systems and directed energy weapons. Low-level surveillance is recommended.

Strong AI development: European limitations hamper the potential of AI, so it is advisable to maintain the so-called frugal AI and to open a line of explainable AI and MoIL.

Hypersonic weapons proliferation: these are attacks for which there is currently no effective defense. It is proposed to foster cooperation with the Space Observatory and to conduct technology watch in other forums.

Development of quantum technologies and 6G for defense: the so-called quantum battlefield and the application of 6G technology are two trends with a high probability of becoming reality. The study recommends looking further into other observatories and analyzing 'Combat Cloud' on 6G as preventive measures.

Mateo Burgos García

Professor at the Higher Technical School of Telecommunication Engineering (ETSIT) of the Universidad Politécnica of Madrid (UPM) and director of the Defense and Security Chair

Cybersecurity Chair

José Javier Martínez Herráiz, director of the Isdefe-University of Alcalá Chair in Cybersecurity, has advanced the results of his prospective report that has analyzed the trends in Cybersecurity based on INCIBE as a source of information.

The study has identified several trends among which it has highlighted three:

IAI and cybersecurity: according to a Cyberark study, 93% of respondents anticipate a negative impact on cybersecurity due to the impact of AI.

Ransomware: ransomware attacks have grown by 72% in Spain, according to the ThreatLabz 2024 Ransomware report that has analyzed the threats produced between April 2023 and April 2024.

Next-level phishing: thanks to AI-based tools, cybercriminals are able to analyze large amounts of data to refine their phishing attacks.

José Javier Martínez Herráiz

Director of the Chair Isdefe-Universidad of Alcalá in Cybersecurity

CETEDEX Support Chair

María José del Jesús Díaz, professor at the University of Jaén and member of the monitoring committee of the Chair in support of CETEDEX, presented the conclusions of the report, which is focused on six projects:

María José del Jesus Díaz

Professor at Universidad of Jaén

- Analyze the potential of generative AI applied to natural language processing and Augmented Information Retrieval. For this purpose, definitions of relevant terms have been obtained from PDF documents.
- Systems for object identification and anomaly detection using satellite and zenithal images.
- To develop a last-mile positioning system for autonomous en-route vehicles that, in a denied GNSS environment and with passive sensors and geospatial data, allows to establish a reliable position of the vehicle.
- Anticipate and analyze trends and possible future scenarios in the field of drone threat detection technologies.
- Analyze possibilities and challenges of high power optical power transmission (HPOT) using lasers, mainly in atmospheric applications.

Transport Observatory

Air Traffic Management Chair

Fernando Gómez Comendador, professor and director of the Chair of Air Traffic Management (ATM) with the Higher Technical School of Aeronautical and Space Engineering (ETSIAE) of the Polytechnic University of Madrid, has addressed current trends by identifying the influencing factors and possible future scenarios that will shape the sector in the coming years.

First, the report diagnosed the current problems facing the industry: lack of capacity and low resilience. It has then pointed to a number of emerging solutions: digitization, automation and interoperability that seek to improve efficiency, responsiveness and cross-border collaboration.

Against this backdrop, the report proposes the following course of action:

- Mapping the objectives of **SESAR** and the **European ATM Master** Plan with Spanish strategic interests.
- Develop strategic partnerships with key agencies such as **Enaire and Aena.**
- Identify and develop capabilities in emerging technologies critical to the modernization of the **ATM** sector.
- Promote collaborations with leading European **ATM** institutions for the exchange of knowledge and technologies.

Fernando Gómez Comendador

Professor and Director of the Chair of Air Traffic Management at the School of Aeronautical and Space Engineering (ETSIAE) of the Polytechnic University of Madrid

Space Observatory

Space Chair

Pablo Fajardo Peña, professor at the Carlos III University of Madrid and director of the Chair of Space, addressed questions such as technological and operational independence, the organization of the sector and the sustainable development of the aerospace industry.

The study has identified current trends, such as the exponential increase of satellites, connectivity in rural areas and international cooperation at space scale. It then highlighted the developments with the greatest potential, including AI, 5G satellite access and spatial data ecosystems.

Conservative

Backed by increased investment, leadership in sustainability and effective public-private collaboration, among others.

Optimistic:

Backed by increased investment, leadership in sustainability and effective public-private collaboration, among others.

Pablo Fajardo Peña

Professor at the Universidad Carlos III of Madrid

ICT Observatory

Chair of ICT and AI

Antonio Portilla Figueras, professor at the University of Alcalá, presented the prospective report that has served to draw two possible scenarios based on variables such as regulation, the promotion of innovation and the development of infrastructures.

José Antonio Portilla Figueras

Professor at the Universidad of Alcalá

Next, identified a number of influencing factors, among which two stand out: 5G technologies and generative AI. Finally, he projected two possible future scenarios:

Pessimistic: Marked by the relocation of companies, the flight of talent, and the technological colonialism due to over-regulation and the brake on innovation, among others.

Realistic: Accompanied by the creation of companies, the reorientation of innovative axes, the attraction of talent, and the creation of and wealth creation as a result of infrastructure development and the creation of a single market.

Energy Observatory

Energy Chair

José María Yusta Loyo, professor at the University of Zaragoza and director of the Energy Chair, concluded the presentation of the prospective reports with an analysis of the outlook for renewable energies.

In his presentation, he stressed that renewable energy is **the most competitive energy source for electricity production worldwide.** In fact, it is ahead of others such as nuclear due to shorter start-up times and greater economic certainty related to capital investment in these facilities.

The report also addresses the need to triple the energy storage capacity in Spain to cover the intermittency of renewables and increase independence from other traditional sources, such as natural gas, **in order to reduce the electricity bill of Spanish households.**

José María Yusta Loyo

Professor at the Universidad of Zaragoza

DEBATE

Debate

Prospective in the Public Administration: A tool to anticipate challenges, improve decision making and design policies

The 2024 Plenary of the Horizons Network also addressed prospective at the service of the Public Administration. To this end, it hosted a colloquium moderated by Antonio Vicedo García Rodríguez, Energy Manager at Isdefe.

Eugenio Martínez Cámara

Professor at the Universidad of Jaén

José Antonio Portilla, UAH professor and director of the Chair in ICT and AI, opened the dialogue with an approach to the projects he is working on. Among them, he highlighted a natural language processing model for **Radio Televisión Española (RTVE)** that optimizes the treatment of complaints and suggestions received by the Ombudsman of the **Listener.** It has also provided technical support in 5G and 6G foresight to the **Secretary of State for Telecommunications.**

For its part, **Eugenio Martínez Cámara, full professor at UJA and member of the CETEDEX Support Chair,** listed the three pillars on which his activity is based: AI, autonomous systems and anti-drone security. As an example, he cited a generative AI and language processing project capable of automatically generating definitions of new concepts.Martínez addressed the current maturity of AI, which in his opinion faces several pending issues such as safeguarding user privacy and defending the individual rights of citizens: "There is still a long way to go to make it really reliable".

José María Yusta, professor at UNIZAR and director of the Energy Chair, explained the objectives of his initiative: "To be aligned with the interests of Isdefe and its clients in areas such as renewables and energy transition. Among them, he highlighted projects aimed at large-scale energy storage, such as reversible pumping, which are beginning to be carried out in Spain.

However, Yusta pointed out that **"the current problem is the pace"** of solar and, especially, wind energy projects in our country. "Spain is still very attractive for investment in renewables, but we still need to attract more investment for energy storage," he said.

On the other hand, **Enrique Ávila Gómez, director of the Analysis and Prospective Center of the Guardia Civil,** explained that his task is to "respond to the demographic challenge in Spain, specifically, to the so-called reverse bomb". To this end, his department has developed an entire ecosystem for strategic decision-makers that integrates elements such as an AI designed to collect data on the affected population, which is then dumped into an interactive futures wheel to anticipate possible scenarios and their ramifications.

Ávila also thanked the talent they receive from universities and praised their "disruptive mentality, which is key to remain multidisciplinary and be able tocontemplate other realities".

Looking to the future, he anticipated that "we must analyze the social impact of technologies such as AI because we are entering a model of algorithmic regime that generates phenomena such as folds that were not possible in an analog regime".

Óscar Jiménez Mateo, head of the Innovation Area for the Spanish Ministry of Defense, explained that his department has 11 observatories dedicated to the most relevant areas for the country's defense, such as space systems. Thanks to these "technological observation and foresight systems", support is provided to the Ministry of Defense in aspects such as strategic planning and R&D. In this sense, he defended that this ministry "has been supporting innovation for decades, as shown by initiatives such as the COINCIDENTE program, which seeks to transfer innovative solutions from the civilian to the military sphere".

Enrique Ávila Gómez

Director of the Analysis and Prospective Center of the Civil Guard

Looking ahead, Jiménez expects AI to continue to gain weight in tasks such as mission planning and expects other advances such as energy generation and storage systems to emerge as **"key technologies" along with quantum mechanics, which "will be very relevant in future weapons systems and will allow us to be more independent from other countries at a strategic level".**

Lastly, **Lucía Blanco Cano, general deputy director of Prospective and Energy Statistics at MITECO,** explained that her department works "on the past and the future of the sector". Thanks to the statistics, they can know the current situation in detail by having "a picture of the industry as current as possible".

They then proceed to generate a strategic framework "with key instruments such as the Energy and Climate Plan to locate where we must have an impact with decarbonization policies".

Blanco stressed that "our plans include objectives and measures resulting from planning based on the international context". He also pointed out that the **National Integrated Energy Plan (PNIEC)** currently includes six prospective models that make it possible to "estimate the uses and demands of energy by sectors and to know the impact on other areas, such as pollution and health". This process finally crystallizes in the form of regulation through the Official State Gazette (BOE)

Óscar Jiménez Mateo

Head of the Planning Area of the General Sub-Directorate of Planning, Technology and Innovation at Spanish Ministry of Defense

Lucía Blanco Cano

General Deputy Director for Energy Foresight and Statistics at MITECO

CLOSING

Closing

Jesús Alonso Martín, , **director of Business Development at Isdefe**, shared the main new features that will be part of the Horizons Network starting next year:

Sign a general protocol of action between the universities of the network and the **Secretary of State for Defense.**

Promote collaboration with university defense centers.

Lead an approach to **CESEDEN** through systems engineering activities.

Design the AI pole to support **CETEDEX** and the **Ministry of Defense.**

Implement micro-credentials and carry out training courses especially requested by the **Ministry of Defense** and I**sdefe.**

The first centers to receive them will be UJA and **UAH** together with **ULE.**

Establish the **Horizons Network** advisory committee, an independent body whose objective is to provide strategic guidance and recommendations on emerging trends and best practices to support decision making, which will be made up of five renowned professionals.

To create the **Isdefe Horizons Network** Award to promote participation in innovation and support for academics and researchers.

The first edition of the award went to **Félix Pérez Martínez, professor emeritus of the Horizons Network advisory committee.**

From left to right: **Jesús Alonso Martín** (Director of Business Development at Isdefe), **Lieutenant General Miguel Ivorra Ruiz** (Director General of Strategy and Innovation for the Defense Industry), **Félix Pérez Martínez** (Professor Emeritus of the School of Telecommunications Engineering at the Polytechnic University of Madrid and Chairman of the Horizon Network Advisory Committee) and **Francisco Quereda Rubio** (CEO at Isdefe).

Lieutenant General Miguel Ivorra Ruiz, Director General of Strategy and Innovation of the Defense Industry, was in charge of closing this edition of the **2024 Plenary of the Horizons Network.** In his speech, he thanked **Isdefe** for "this space where strategic reflection and foresight have been the protagonists".

"From a defense and security perspective, foresight is even more valuable as it allows us to explore how we can redefine the nature of conflicts and the framework of international cooperation," he said. Horizons Network not only identifies the most impactful technology trends, but it also connects experts to develop a multidisciplinary approach to maximize benefits and mitigate risks," he added.

"**Horizons Network** is an important hub that ensures a multidisciplinary response to the challenges of the future and is aligned with the strategic priorities of government and defense," he said. In addition, "it involves the talent of Spanish universities, an indispensable resource for maintaining a renewed vision of the future," he added.

> **"We close this day with the certainty that prospective is a way to inspire action in the present. The future is not to be expected, it is to be built. The only way to lead it is to act with vision, courage and unity".**

Teniente general Miguel Ivorra Ruiz

General Manager of Strategy and Innovation of the Defense Industry

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