JANUARY
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2025

05 SenForFire NEWSLETTER

SENFORFIRE. LOW-COST WIRELESS SENSOR NETWORK FOR FOREST FIRE PREVENTION AND EARLY DETECTION (S1/1.1/E0040)

SenForFire and BRIF participants in the prescribed burning carried out in pilot area P2 (Encinedo, El Bierzo, León)

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DEVELOPMENT OF PROTOTYPE 4 SEC COMPLETED

EVALUATION OF SENSORS IN PILOT ZONES 1 AND 2

MEETINGS WITH END USERS OF THE PROJECT

Advances in technology, strategy and collaboration

This edition of the SenForFire Newsletter collects the main activities and achievements of the working groups during the first quarter of 2025. Among the most important milestones are the results evaluation meeting after the tests carried out in Avila and Madrid, as well as the first progress interview with the Joint Secretariat of the Interreg Sudoe programme, where new strategic priorities were agreed. In addition, contacts have been initiated with the regional governments of Catalonia and Madrid, which are interested in replicating the environmental monitoring campaigns using RIS sensors, and the SenForFireNoticias magazine has been launched.

On the technical side, the development of the new SEC prototype was completed and the MOX modules were updated and tested in real conditions during prescribed burns in Ávila and Encinedo (León), with very promising results. At the same time, scientific articles were prepared for the 9CFE and EXPAT25 congresses, and the corporate video was disseminated. Meetings with end-users have allowed fine-tuning the design of future pilot campaigns and integrating the participation of volunteers, consolidating the practical and collaborative approach of the RIS system for early fire detection.

Interreg Sudoe
Co-funded by the European Union
SenForFire

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FEBRUARY
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Follow-up of the Communication Plan of the project. The head of communication Macarena Parejo (UEX) has attended the follow-up meeting convened by the Joint Secretariat (JS) to present the progress made in relation to the approved Communication Plan. As a result of what was presented during the meeting, we have been asked in writing for an extension of the interview questionnaire, including more detailed information on the milestones achieved and the pending objectives. The added information is available here.

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***SenForFire News*: *Fire-fighting technology*.** Design and launch of a quarterly magazine aimed at the general public. Published in Spanish and English, its aim is to bring technological advances, research and initiatives in forest fire prevention closer to the general public, thus promoting greater awareness and social involvement.

Social Media Management. Update of dissemination campaigns on LinkedIn, Facebook, X and Youtube channels.

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Technical visit to Ray Ingeniería. The team from the University of Extremadura visited the Ray Ingeniería facilities in the town of Mirabel (Cáceres, Extremadura). They discussed about the sensors that should be incorporated in the low consumption modules, comparing technical data and results obtained in past experiences.

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Meeting to evaluate the results. A meeting was held with the project participants, attended by the UEX team, where the results obtained in the tests carried out at the INIA-CSIC facilities and in Arenas de San Pedro (Ávila, Castilla y León) were discussed.

FEBRUARY 6

1st Project Progress Interview. The 1st progress interview of the project required by the Joint Secretariat (JS) of the Interreg Sudoe programme was held. The interview was attended by the SenForFire project manager (Alexandra Lopes), the programme communication manager (Antonio Teles) and the JS director (Isabelle Roger) and nine people from the SenForFire project: the coordinator (Esther Hontañón), the communication manager (Macarena Parejo), the heads of the task groups (ICIFOR-INIA-CSIC, CNRS and UEX) and representatives of Arantec, the University of Évora and the University of Coimbra.

During the interview, the JS highlighted several priorities for 2025: to collect testimonies from end-users on the suitability and benefits of RIS technology in the prevention and early detection of fires at local scale; to expand the scope of the project by replicating or implementing new pilot activities in other territories of the Sudoe; to create synergies with other Interreg projects (Sudoe, Poctep, Poctefa) and other European programmes; and to increase the production of audiovisual materials for the communication and dissemination of the project and its results.

MARCH

New environmental measurement campaigns. Contacts have been initiated with new end-users, who have expressed interest in replicating in their territories similar activities to those to be carried out in the pilot areas of the project. In particular, sensor-based soil moisture and forest fuel (live and dead) moisture monitoring campaigns.

The most relevant end-users are the governments of the Autonomous Communities of Catalonia and Madrid. In the Community of Madrid, campaigns to measure soil moisture and forest fuel with low-cost sensors are planned to start in May.

On the other hand, ITEFI-CSIC has reached an agreement with the Madrid City Council to carry out measurements of air pollutants (gases, volatile organic compounds and particles) with sensor nodes for the detection of fire emissions and air quality monitoring located in stations of the City Council's Air Quality Network from May onwards. The aim of these campaigns is to calibrate the sensors.

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A 1.5

Launch of the corporate video. The corporate video of the project produced by the audiovisual animation company Ozonemotion has been published. Three versions have been produced: with English, Portuguese and French subtitles. The video can be viewed on YouTube. Video with English subtitles: https://youtu.be/nWj2aJuNXYc?si=JSIe19nx7tR6n6YU

SenForFire Interreg Sudoe - Vídeo animado explicativo do projeto - Legendas PT

SenForFire 3 suscriptores · Suscrito · 0 · Compartir · Clip

SenForFire Interreg Sudoe - Vidéo animée explicative du projet. Sous-titres FR

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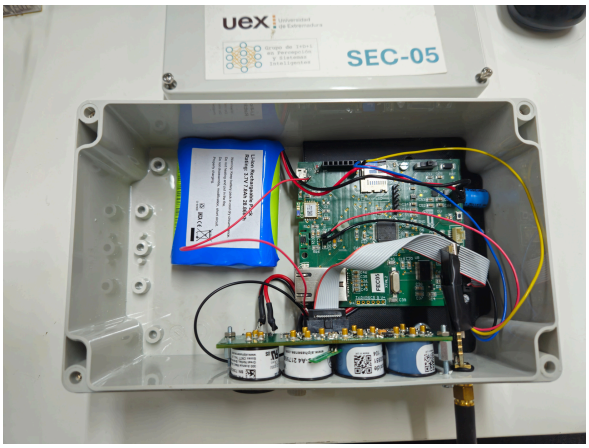
A 2.2

Finalisation of prototype 4 SEC. The development of prototype 4 (SEC - EC- sensors) has been completed, consisting of three electrochemical sensors (CO, NO_2 and VOC) and a PID sensor (PhotoIonisation Detector). The device incorporates a battery to provide autonomy and has integrated LORA communication, which allows it to transmit data over long distances. Six modules of this type have been manufactured.



MOX prototypes upgrade. The MOX prototypes have received an upgrade from measuring only CO_2 and temperature via an SCD40 sensor to also include VOC readings via the SGP40 and ENS160 sensors. In addition, the number of available modules has been increased to four.

A 2.4

MARCH 31

Prototype tests in Encinedo. Tests were carried out in Encinedo (León, Castilla y León) where both the new prototype 4 (SEC) and the update of prototype 2 (MOX) were evaluated. During the tests, a total of ten modules were installed (6 SEC and 4 MOX). The results were positive, reaching saturation of the sensor responses in the first minutes with the presence of fire.

A 2.5

Articles written for the 7th International Experimental EXPAT25 Conference. Two papers have been written for the 7th International Experimental EXPAT25 Conference: 'Multisensor System for Early Fire Detection Using Gas and Particulate Sensors' and 'Early Wildfire Detection with Metal Oxide Gas Sensors: A Smart Approach for Real-Time Monitoring'.

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A 3.3

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Evaluation of sensors in prescribed burning in the P1 pilot area. A prescribed burn was carried out in a forest plot in the pilot area P1 (Arenas de San Pedro, Ávila), with the aim of providing training to the personnel of the Forest Fire Reinforcement Brigades (BRIF) of the Ministry for Ecological Transition and Demographic Challenge (MITECO). The burn lasted approximately one hour, with a burned area of about 900 m².

For the first time in the project, the performance of a variety of low-cost sensor technologies for early fire detection was evaluated, focusing on the measurement of gases, volatile organic compounds and airborne particles under conditions similar to real fires. For this purpose, a network of four nodes was deployed: three nodes with multi-sensor modules developed by ITEFI-CSIC, RAY-IE and UEX, and a meteorological station supplied by Arantec, which includes a fine forest fuel moisture sensor. The three nodes were located about 30 metres from the starting point of the fire, where the weather station was also located.

The data from the sensors were sent wirelessly to the cloud server set up by the University of Évora, through the LoRaWAN gateway provided by Arantec, and were visualised in real time.

ICIFOR-INIA-CSIC participated in this activity as the entity entrusted by MITECO with the execution of the prescribed burns.

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A 3.4

Preparation of articles for the dissemination of results at conferences. Several articles have been prepared to disseminate the results of the fire detection tests using low-cost commercial sensors, carried out at the ICIFOR-INIA-CSIC (Madrid) pilot facility in November 2024, and of the prescribed burning carried out in the P1 pilot area on 16 January 2025.

The articles have been sent for presentation at the 9th Spanish Forestry Congress (9CFE) in Gijón (16-20 June 2025) and at the special session on Innovation in Forest Fire Risk Management (IFFRM) of the Expat'25 international conference in Horta, Azores (3- 5 September 2025).

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JANUARY AND FEBRUARY

A 3.3

Meetings with end users of the project. ITEFI-CSIC and ICIFOR-INIA-CSIC held remote meetings with each of the end users of the project technology. These included both the beneficiary public administrations and agencies (Municipality of Fundão and General Directorate of Cultural Heritage of the Junta de Castilla y León), and the partners (General Directorate of Forest Fire Prevention of the Junta de Extremadura, Diputación de Ávila and the Agency for Research and Innovation of Andorra).

The aim of the meetings was to determine the scope and specific objectives of the RIS validation campaigns to be implemented in each of the pilot areas (prevention, early detection and/or air quality monitoring), as well as to define the groups of volunteers to be recruited for their implementation.

A 3.3

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Prescribed burning in the pilot area P2. A prescribed burn was carried out in a plot of the P2 pilot area (Encinedo, El Bierzo, León) with the aim of recovering the plot for livestock grazing. The burning was carried out by members of the BRIF, with the collaboration of ICIFOR-INIA-CSIC personnel. For approximately three hours, an area of around 5 ha was burned.

A RIS was deployed that included the four nodes used in the previous burn, as well as several additional nodes. The burn was divided into two stages of approximately one hour duration each, with one hour in between. During this interval, ambient air conditions were restored thanks to the strong wind in the area, which favoured the rapid clearing of the atmosphere. Unlike the P1 burn, in the P2 burn the nodes were distributed at distances varying between 300 and 1000 metres from the fire starting point.

Deployment of RIS for fire detection during prescribed burning in the pilot area P2