

6G SNS



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***SEamless integrationN of efficient 6G Wireless
tEchnologies for Communication and Sensing***

**D6.3 Final Standardisation, Dissemination, Communication and
liaison Activities Report**

July 2026

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Executive Summary

The aim of 6G-SENSES deliverable D6.3 is to report all standardisation, dissemination and communication actions performed during the duration of the project.

Regarding standardisation, details on the impact on and relations with standardisation bodies are summarised.

Regarding dissemination and communications aspects, a summary of website and social media presence, issued newsletters, accepted scientific publications, workshops, and events to which 6G-SENSES participated or drove is provided.

Regarding the external liaison, consortium participation in activities promoted by the Smart Networks and Services Joint Undertaking (SNS JU) and the 6G Infrastructure Association (6G IA) working groups (WGs) are reported.

Finally, the overall status of the project dissemination and communication is compared against the proposed Key Performance Indicators (KPIs) as provided in the description of Work (DoW).

1 Introduction

The dissemination and communication strategy of 6G-SENSES was defined in deliverable D6.1 [1], finalized in project M06, which set the basis, channels, and guidelines needed to target project stakeholders, i.e., specific groups covering a wide range of audience, including industry partners, academia, public authorities, standardisation bodies, and end-users.

D6.2 [2] provided a first and preliminary detailed list of achieved results till project month 19, elaborating on standards impact, dissemination and communication actions, and liaison activities with other projects and the SNS JU / the 6G IA association WGs.

This deliverable, D6.3, updates the information provided in D6.2 and summarises all actions related to standardisation, dissemination and communication, as well as liaisons activities, performed during the project lifetime.

D6.4, made available in the same month as D6.3, complements the content of D6.3 with a final report on Business Plans, Exploitation Strategies and Project Impact Assessment, thus concluding the report of the set of topics under the responsibility of 6G-SENSES WP6.

All consortium partners contributed to the several D6.3 activities, each partner bringing its own expertise and related capabilities.

D6.3 comprises seven chapters, which follow the Chapter 1 dedicated to the introduction.

Chapter 2 summarises the standardisation activities performed in the scope of the project targeting different Standard Development Organisations (SDOs) on various domains.

Chapter 3 focuses on communication and dissemination activities as a crucial part of innovative projects and as the means of raising awareness and transferring knowledge to interested parties. Relevant activities carried until month 30 are presented in detail including: 6G-SENSES website, social network disseminations, press releases, participation in industry events, participation in and organisation of conferences/ workshops / summits and webinars.

Chapter 4 provides a detailed overview of the 6G-SENSES participation in SNS and 6G IA WGs.

Chapter 5 provides the deliverable conclusion.

Chapter 6 contains the mentioned references.

Chapter 7 lists all the acronyms used in this deliverable.

2 Standardisation activities report

Standardisation activities within the **6G-SENSES** framework are both diverse and impactful. The project has actively contributed to the exploration and integration of existing technologies with advanced 5G connectivity and emerging 6G solutions. This includes identifying and addressing the technical requirements and specifications necessary for these innovations. Notably, **6G-SENSES** has made significant strides in aligning its research with the work of SDOs, aiming to enhance and extend existing standards. Contributions have included technical reports, participation in WGs, and the submission of proposals to relevant standardisation bodies.

These efforts have been disseminated through various channels, with key findings published in scholarly and professional journals, reinforcing the project role in shaping the future of communication standards.

2.1 Standardisation contributions

2.1.1 INT contributions

The contributions of **INT** are outlined in this subsection, which entails four main topic areas: 6G Technology Development, Standards Leadership, Ecosystem Engagement, and Publications and public events.

6G Technology Development

INT contributed in the first half of 2026 to standardisation work on **IEEE 802.11bn (Wi Fi 8)** by submitting the 11bn amendment “Resolution for comments received for LB291 on D1.0 for subclause 38.3.16.3.6 and 38.3.16.3.8”, IEEE doc number “IEEE 802.11-26/0724r1”, contribution type ‘LB291 contributions (CIDs and CRs)’. The amendments need to progress systematically through several phases, as normal in any IEEE approval flow, which consists of the steps: 1) proposals; 2) comments; 3) resolution; and, finally, 4) approval. In Q2 2026, the document is located between phases 2) and 3). **INT** will continue the progress of this doc in forthcoming meetings with an expected approval happening in Q4 2026 or Q1 2027. From the technical point of view, the contribution is related to packet encoding and Null Data Packet (NDP) frame formats which are used for both communications and sensing and is part of the broader Intel’s standardisation engagements and efforts in ICAS-related topics.

INT prepared and submitted two contributions to the **GSA 6G Joint Working Group (6GIG) Meeting #6**:

- One on 6G Day-1 Physical layer (PHY) / Radio Access network (RAN) features
- One on Internet of Thing (IoT) for 6G

INT summarized Artificial Intelligence (AI) for PHY use cases for potential 3GPP specification. Presented the main findings during the Standards and Technology Update session, including AI-driven PHY use cases. A recommendation was issued to focus on the following use cases for further study:

- Channel State Estimation (CSI)-Reference Signal (RS)/ Demodulation RS (DMRS)/ Sounding RS (SRS) overhead reduction
- CSI feedback enhancement

INT further investigated 6G AI for PHY use cases and typical models, with a focus on base station-side models (a draft summary is available). The following use cases were studied:

1. Power Amplifier (PA) distortion compensation
2. CSI-RS overhead reduction
3. CSI feedback overhead reduction
4. DMRS/SRS overhead reduction

Use cases 2–4 fall under a common category: channel denoising/reconstruction based on partial channel information. This is analogous to image denoising/reconstruction, a well-studied area in AI. Typical AI models explored include:

- Predictive models: Multi-Layer Perceptron (MLP) and its variants (e.g., MLP-Mixer)
- Convolutional models: Convolutional Neural Network (CNN) and its variants (e.g., ResNet, Autoencoders)
- Generative models: Transformer, Variation Autoencoder (VAE) / Vector Quantized VAE (VQVAE), Diffusion

The main challenge identified is model generalisation. The next step is to further assess the feasibility and performance of these use cases, with a focus on generalisation.

Initiated assessment of AI for radio use cases emerging from 6G ongoing discussions and the 3GPP 6G Workshop. Two use cases were studied:

- AI-based PA distortion compensation.
- AI-based channel estimation/prediction and RS overhead reduction.

Findings on PA distortion compensation highlighted the following limitations:

- Model generalisation across various UE PA models and operational variations (e.g., temperature changes).
- Complexity and cost of online training.
- Misalignment between the intended goal (Uplink (UL) cell edge coverage improvement) and the actual focus – Error Vector Magnitude (EVM) reduction for high-order modulations like 256 Quadrature Amplitude Modulation (QAM) and above.

The AI-assisted channel estimation/prediction use case was identified as more promising. Variants include:

- Channel estimation with reduced RS overhead
- Time-domain channel prediction
- Spatial-domain channel prediction
- Full channel state information estimation/prediction
- Partial CSI estimation/prediction (e.g., Angle of Arrival (AoA) only)

Generative models are considered well-suited for this problem. Performance evaluation has begun to assess the potential of AI in channel estimation and prediction.

Based on a detailed analysis of technical contributions from equipment vendors and network operators to the GSA 6G Joint Working Group, 6GIG, and the 3GPP 6G Workshop, **INT** produced an initial list of 6G RAN features.

INT actively contributes to the **IEEE Wi-Fi Integrated MilliMeter Wave (IMMW)** standardisation process through the official IMMW contribution platform. As part of its technical engagement, **INT** presented a summary of its contribution in the related conference paper “OFDM-Based mmWave Wi-Fi Integrated Sensing and Communication (ISAC) System Implementation for Monostatic Human Sensing” at the 20th European Conference on Antennas and Propagation ([EuCAP](#)) held in Dublin, Ireland, in April 2026 [3], to support alignment with the evolving IMMW specifications and to enhance the visibility of its innovations in this domain. **INT** also contributes to the evaluation of sensing features, focusing on performance, feasibility, and integration into the standard. In parallel, **INT** is engaged in discussions on IMMW waveform design, aiming to shape the technical direction of IMMW sensing capabilities. Through these efforts, **INT** seeks to influence early decisions on IMMW sensing design and ensure that its technology roadmap is well

reflected in the IEEE IMMW standards. Another paper reporting some latest achievements in this domain is “Interference Leakage Impact on Monostatic mmWave Sensing: OFDM vs FMCW Performance with Practical 40 dB Isolation at 60 GHz” presented in June 2026 at the EuCNC conference in Malaga [4].

Standards Leadership

- 3GPP – Puneet Jain (**INT**) was re-elected as Chairman of 3GPP SA (Services and System Aspects) for a second two-year term.
- IEEE – Cheng Chen (**INT**) was elected Editor during the IEEE 11bq standardisation process.

Ecosystem Engagement

3GPP collaborations

- a. 3GPP RAN ecosystem discussions - Held discussions with 3GPP RAN4 Chair (Apple) on the scope of Rel-20 6G study item RAN4, providing Intel’s views on project organisational aspects as well as candidate objectives and prioritisation; Engaged with Ericsson on the interim milestones for the 6G study. Compared to prior discussions of these milestones among all the GSA companies, they preferred very early decisions (back in December 2025) on some of the key PHY characteristics such as waveform, modulation and channel coding. This may be over optimistic given the study will have been ongoing for only 6 months (3 RAN1 meetings). The milestones have been defined in the RAN#108 plenary meeting held in June 2026. **INT** engaged with Ericsson on the key characteristics of the lowest capability IoT devices to be supported in 6G, leading to co-sourcing of an input into the RAN plenary study item on 6G requirements. Understanding these lowest end capabilities will be necessary for many 6G design decisions (e.g., related to initial access). **INT** engaged with Samsung on the scope of Rel-20 5G-Advanced work on Multiple Input Multiple Output (MIMO) enhancements. As a result, we will support a way forward, along with 20+ other companies, proposing that the Rel-20 work will focus on UL capacity and coverage enhancements, and Downlink (DL) CSI acquisition enhancements for Frequency Range (FR) 1. **INT** engaged with AT&T on 3GPP and Open RAN (O-RAN) collaboration during 6G and specifically on the referencing of O-RAN’s fronthaul specifications from within the 3GPP specifications. The referencing was a controversial discussion in the RAN#108 plenary in June and a decision on how to continue was postponed to future meetings. Intel also supported an initiative among the GSA companies to find a way forward acceptable to all parties.
- b. **INT** is collaborating with Apple, Ericsson, Lenovo, and AT&T to address the contentious issues in the Rel-19 AIML_CN specification work related to the user consent and privacy profile check that was postponed from the April SA2 meeting. Specifically, **INT** proposed solutions regarding which entity should perform the UE Location Services (LCS) privacy check for the AI/Machine Learning (ML) monitoring procedure and whether the Network Data Analytics Function (NWDAF) Model Training Logical Function (MTLF) could store Probing Unit (PRU) / UE data samples as historical data in the Analytics Data Repository Function (ADRF). Following multiple rounds of discussions during SA2#169, a majority of companies (including Ericsson, AT&T, Lenovo, China Mobile, and Huawei) expressed support for the solution proposed by **INT** to address LCS privacy concerns. However, there was intense discussion on this issue in SA2 without any outcome and the final decision would be based on SA3 response to SA2 on the user consent requirement for this issue.
- c. **INT** moderated the discussions in 3GPP SA5 on the Rel-20 5G-Advanced study on AI/ML Management Phase 3, which resulted in a SID being submitted to and agreed SA5#161.
- d. **INT** collaborated with Samsung for approval of a common solution to standardize LTM (layer 2 triggered handover mode) between two CUs when dual connectivity is not in use. A two-phase key-

derivation chain in which the source-CU supplies key materials to the target-CU was accepted at the SA3#121.

GSA collaborations – System aspects

INT organized a GSA meeting hosted by Apple to discuss SA aspects of the 6G study, where member companies shared views on the SA2 6G Study objectives. Key topics included sub-work tasks under the overall 6G architecture, with discussions on scope, alignment with 5G-Advanced, and the need for input from RAN and other WGs on areas like migration, AI, sensing, data framework, computing, IP Multimedia Subsystem (IMS), Non-Terrestrial Network (NTN), and Cellular IoT. A tentative study timeline was outlined for Aug–Nov 2025, with updates provided in Dec 2025, and alignment with RAN targeted for June 2026, which however did not take place due to the crowded agenda of the June meeting. A draft 2025–2026 GSA meeting calendar was also presented, with proposals for broader participation and a potential joint SA-RAN session, with further coordination to continue via E-mail.

Publications and public events

- INT participated in the Opening Ceremony, Main Forum, and Round Table Discussion at “Global 6G Conference 2025”, Nanjing, China hosted by China FuTURE Forum and Purple Mountain Laboratories.
- INT gave an interview to TCCA – The Critical Communications Association – discussing updates from the 6G Workshop and TSG SA#107 meetings, with a focus on public safety and critical communications. The interview is available on the TCCA YouTube channel [\[LINK\]](#).
- INT presented a set of papers on the topics discussed above and on WI-Fi sensing as follows:
 1. J. Sanson, R. Shah, M. Pinaroc, V. Frascolla, “Extracting Range-Doppler Information of Moving Targets from Wi-Fi Channel State Information,” IEEE Global Communications Conference (Globecom), 08-12.12.2025, Taipei, Taiwan.
 2. Y. Zhu, R. Shah, M. Pinaroc, V. Frascolla, “AI-Driven Human Wi-Fi Sensing with Hierarchical Architecture and Breathing Detection,” in IEEE WiSense: 3rd International Workshop on Pervasive Wireless Sensing and Edge Computing ([Wisense](#)), 16-20.03.2026, Pisa, Italy. <https://zenodo.org/records/18593301>.
 3. J. Sanson, R. Shah, V. Frascolla, “Human Presence Detection via Wi-Fi Range-Filtered Doppler Spectrum on Commodity Laptops,” in IEEE WiSense: 3rd International Workshop on Pervasive Wireless Sensing and Edge Computing ([Wisense](#)), 16-20.03.2026, Pisa, Italy. <https://doi.org/10.48550/arXiv.2603.10845>.
 4. J. Sanson, R. Shah, M. Pinaroc, C. Tanriover, V. Frascolla “LiveSense: A Real-Time Wi-Fi Sensing Platform for Range-Doppler on COTS Laptop,” in IEEE International Conference on Pervasive Computing and Communications ([PerCOM](#)), 16-20.03.2026, Pisa, Italy. <https://doi.org/10.48550/arXiv.2603.0654>.
 5. Y. Zhu, R. Shah, V. Frascolla, “OFDM-Based mmWave Wi-Fi ISAC System Implementation for Monostatic Human Sensing,” in Proc. of the 20th European Conference on Antennas and Propagation ([EuCAP](#)), 19-24.04.2026, Dublin, Ireland.
 6. J. Sanson, R. Shah, Y. Zhu, R. Rosales, V. Frascolla, “Wird-gest: gesture recognition in the real world using active range-doppler Wi-Fi sensing COTS hardware” in *IEEE International Conference on Communications (ICC)*, 24–28.05.2026, Glasgow, UK <https://doi.org/10.48550/arXiv.2603.22131>.

7. Y. Zhu, R. C. Shah, U. Parker and V. Frascolla, "Interference Leakage Impact on Monostatic mmWave Sensing: OFDM vs FMCW Performance with Practical Passive Isolation," *2026 Joint European Conference on Networks and Communications & 6G Summit (EuCNC/6G Summit)*, Málaga, Spain, 2026, pp. 405-410, doi: 10.1109/EuCNC/6GSummit68295.2026.11577446.

2.1.2 IHP contributions

The European Telecommunication Standards Institute (ETSI) is a not-for-profit standard-setting organisation in the field of telecommunications. Operating under ETSI, ETSI Industry Specification Group (ISG) on Multiple Access Techniques (MAT) provides an opportunity for its members to share their research results and cooperate on building a wider consensus between academia and industry on new multiple access techniques for the upcoming 6G systems based on 3GPP specifications.

The main focus of ISG MAT is DL MATs improving the transmission efficiency on the PHY. Candidate multiple access techniques are Orthogonal Multiple Access (OMA), Non-Orthogonal Multiple Access (NOMA), Space Division Multiple Access (SDMA), and Rate Splitting Multiple Access (RSMA). ISG MAT will produce periodic group reports that can support the 6G standardisation activities of 3GPP. Some of the areas of activities can be listed as the study of transmitter and receiver processing, PHY layer procedures, link-level and system-level performance, and potential specification impact.

As a part of ETSI ISG MAT, **IHP** is regularly participating in bi-weekly online conference calls and actively taking part in discussions for the study items. We contribute to the group report and standardisation activities by also supporting the cross-check of the results in the literature for comparison of different MATs in terms of the sum-rate and relevant performance metrics. In addition, we attended the second plenary meeting on May 14-15 2026, where text proposals for the first group report were discussed in detail.

Furthermore, **IHP** will attend the third plenary meeting which will be held in Barcelona on October 8-9, 2026, where the text proposals for the candidate MATs and basic performance evaluation, which we directly contribute by the cross-check of the results, will be discussed. Besides, the new work items for the ISG MAT Phase 2 will be discussed in that same meeting.

2.1.3 TUBS contributions

The research group at TU Braunschweig (**TUBS**) focuses on PHY design for ISAC systems, particularly on beamforming strategies that balance sensing accuracy and communication performance. We have developed a joint optimisation framework with Signal-to-Interference-plus-Noise Ratio (SINR), for communication, and Signal-to-Noise Ratio (SNR), for sensing, as objective functions, and conducted small-scale simulations on a computer to achieve globally optimal results.

Currently, we are extending our model to include multiple users and multiple sensing targets, aiming to design an optimal joint beamformer for ISAC scenarios. In parallel, we are preparing a laboratory validation platform using a movable antenna array to demonstrate a small-scale setup. The simulation framework will also be scaled up to evaluate more complex ISAC configurations.

This work directly supports the ongoing 3GPP RAN1 discussions under the Rel-20 ISAC study item.

Furthermore, **TUBS** presented at the IEEE 802 Plenary meeting in Bangkok in November 2025 the contribution "Impact of Exclusion Zone on Interference Between 5G NR-U and Wi-Fi Under Co-Channel Operation in the 6 GHz Band", document number "IEEE 802.18-25/0107r0". The contribution was based on a paper presented in September at IEEE PIMRC. This presentation was originally presented at the IEEE 802.18 TAG Regulation meeting, where the chairs of IEEE 802.19 WG Coexistence and the IEEE 802.11 Sc Coexistence requested to present the work also to their groups. So instead of one presentation TUBS ended

up presenting this 6G-Senses work three times during the same week. The topic turned out to be a hot one, and the contribution trigger a lot of discussion in the WG.

Furthermore, **TUBS** presented the input document “Update on Investigations on Interference from 5G NR to Wi-Fi under Co-Channel Operation in the 6 GHz Band”, document number “IEEE 802.18-26/0048r0” in May to the meeting in Antwerp to the groups IEEE 802.18, IEEE 802.19 and IEEE 802.11 SC Coexistence. The presentation further analysed interference between 5G NR-U and Wi-Fi under co-channel operation for specific scenarios and demonstrated that Coexistence of Wi-Fi and 5G NR licensed is infeasible for the considered scenario as only 48% of Wi-Fi devices met the required interference threshold (assuming 20 MHz channels). However, the work also showed that the coexistence of Wi-Fi and 5G NR-U in frequency ranges with equal power constraints seem promising, as exclusion zones of 100 – 300 m can mitigate all relevant interference.

2.2 Activities per standardisation body and sector

This section includes a dedicated subsection for each standardisation body, where **6G-SENSES** partners have contributed. Each subsection highlights the respective contributions and key achievements.

Table 2-1 Targeted SDOs for each of the 6G-SENSES participants to standardisation activities

Partner	Target Domain	Target SDOs
INT	6G Technology Development	6GIG, 3GPP
INT	AI for PHY Use Cases	3GPP
INT	AI for Radio Use Cases	3GPP
INT	6G RAN Features Definition	GSA, 6GIG, 3GPP
INT	Standards Leadership	3GPP SA
INT	RAN Ecosystem Engagement	3GPP RAN, O-RAN
INT	Rel-19 AIML_CN Specification	3GPP SA2, SA3
INT	AI/ML Management Phase 3	3GPP SA5
INT	LTM Standardization	3GPP SA3
INT	SA2 6G Study Coordination	GSA, 3GPP SA2
INT	Publications and Events	Global 6G Conference, TCCA
INT	Publications and Standard contributions	IEEE IMMW
INT	Presentation of an amendment doc	IEEE 802.11bn (Wi Fi 8)
IHP	Attendance and contribution to the SI	ETSI SIG MET
TUBS	Presentation of documents	IEEE 802.11 SC Coexistence, IEEE 802.18 TAG Regulation, IEEE 802.19 WG coexistence

3 Communication and Dissemination Activities report

6G-SENSES defined a plan of communication and dissemination activities to be performed as described in deliverable **D6.1** [1]. Deliverable **D6.2** described the dissemination and communication activities conducted by 6G-SENSES from the start of the project until M20, providing an update on the status of these activities.

Table 3-1 presents the list of target KPIs that 6G-SENSES has established for the different identified actions. The achievements in dissemination and communication have been periodically gathered and compared to the targets.

Table 3-1 Key Performance Indicators (KPIs) for dissemination and communication

Measure	Indicators	Target	Means of verification	KPI achieved?
Posters	Number of posters produced	2 in total	Dissemination reporting activities	Posters prepared for both EuCNC 2025 and EuCNC 2026
High-level materials for policy makers	Number of sets (mission statement, slide-deck, brochure)	At least 1 per year	Dissemination reporting activities	3
6G-SENSES website	Number of unique visitors	> 1000 visitors/year	Google analytics	2500 visitors in total
Social networks	Number of followers in LinkedIn	> 100	Active profiles on such networks via regular posting & monitoring	283
6G-SENSES Workshops	Number of workshops and number of participants	3 workshops (100 participants/event)	Attendance proofs (e.g., photos, presentations, videos, interviews)	3
Videos	Number of videos published on the project's YouTube channel and average number of views	2 videos and > 500 views per video	Videos published via the YouTube channel of the project	5
Scientific publications	Number of peer-reviewed papers/articles	At least 25 by the end of 6G-SENSES	Papers/articles published in proceedings & online in premium quality conferences and journals.	70 (see section 3.4)

3.1 Project Website and Dissemination Material

The 6G-SENSES project website served as the main digital dissemination channel throughout the implementation period, providing stakeholders with access to project information, news, events, publications, and results. Website analytics demonstrate that it successfully reached a broad international audience and supported the dissemination of project outputs.

During the last reporting period (January 2025–May 2026), the website recorded **2,697 sessions**, generated by **2,220 users** (see Figure 3-1). The number of new users (**2,221**) was almost identical to the total number of users, indicating that the website continuously attracted new visitors and successfully extended the project's outreach.

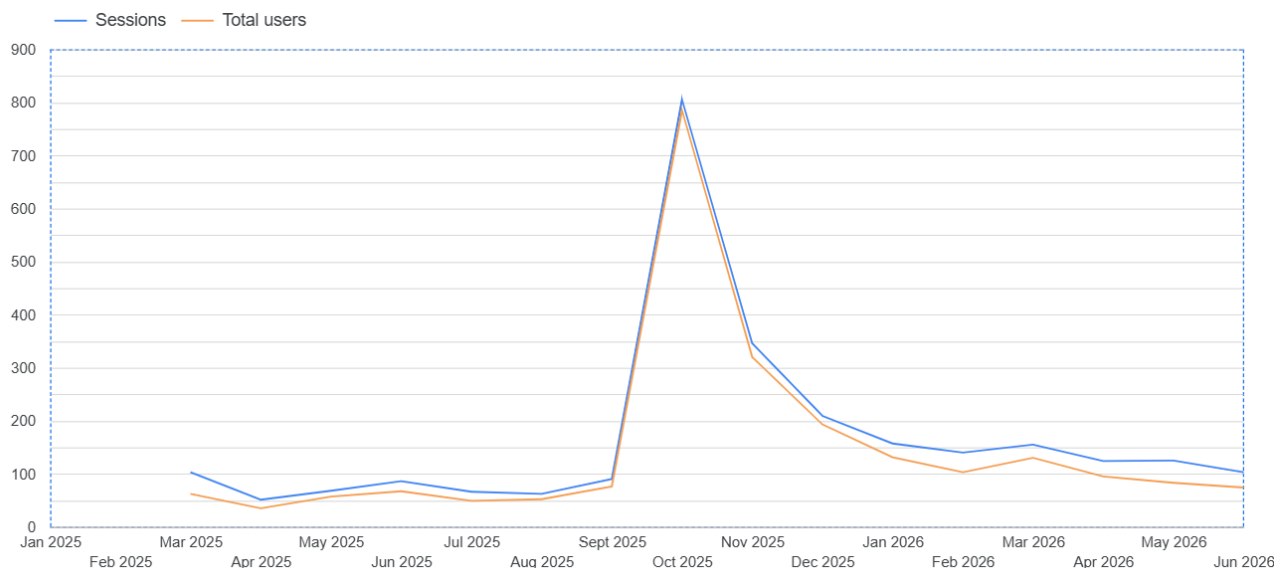


Figure 3-1 Evolution of website sessions and total users during the reporting period (Jan 2025–May 2026)

User engagement was also positive, with an **average engagement time of 1 minute and 47 seconds** per session. This indicates that visitors were actively interacting with the website content rather than leaving immediately after accessing the site, suggesting sustained interest in the project's activities, news, and results.

The evolution of website traffic over time (see Figure 3-1) shows a marked increase in both sessions and users in October 2025, corresponding to a period of intensified dissemination activities and the publication of key project outputs. Following this peak, website traffic gradually stabilised, maintaining a consistent level of activity throughout the remainder of the reporting period. This pattern suggests that dissemination activities successfully generated visibility while also supporting continued interest in the project.

To measure the impact of the **6G-SENSES** project website, performance statistics are collected, such as: number of users visiting the website, number of sessions, average session duration, bounce rate, etc. Project management has kept track of social media posts and statistics. Website analytics were collected using Google Analytics 4 (GA4) for the period from 1 January 2025 to 30 June 2026. Daily website performance metrics were exported from GA4 and analysed to assess user acquisition, engagement, content performance and audience reach.

The website achieved a substantial international outreach, attracting **2,220** users from **79** countries over the reporting period (see Figure 3-2). Users accessed the website from a geographically diverse range of countries across Europe, North America, Asia, South America, Africa and Oceania, reflecting the project's ability to engage a global audience. The highest numbers of users were recorded from the United States (743), China (428), Singapore (294), Germany (197) and Spain (164). This broad geographical distribution demonstrates the effectiveness of the website as a dissemination channel and supports the project's objective of ensuring wide accessibility and visibility of its results.

The homepage served as the primary entry point to the project website, accounting for the majority of website sessions. Beyond the homepage, users showed particular interest in the **Motivation, About the project, Proof of Concepts, Publications, and Deliverables** pages, indicating that visitors actively sought information on the project's objectives, technical developments and publicly available outputs. Dissemination-related pages—including publications, public deliverables and contributions to 6G standardisation—were among the most frequently visited sections of the website, demonstrating stakeholders' interest in the scientific and technical outputs generated by the project.

The project consortium has committed to maintaining the website after the end of the project for a minimum period of 5 years, ensuring continued public access to project results, publications and other key outputs.

	Country	Total users ▾
1.	United States	743
2.	China	428
3.	Singapore	294
4.	Germany	197
5.	Spain	164
6.	Netherlands	59
7.	Taiwan	45
8.	Greece	43
9.	United Kingdom	43
10.	Türkiye	40
11.	France	36

1 - 79 / 79 < >

Figure 3-2 Geographical distribution of website users by country (Period January 2025–May 2026)

The project website supported the dissemination of project outputs by providing access to downloadable resources. During the reporting period, 287 file downloads were recorded, demonstrating that visitors not only consulted website content but also accessed project materials for further use.

A total of **1,326 scroll events** were registered, suggesting that users actively engaged with the website content and explored pages in depth.

3.2 Social Media

Project management keeps track of social media posts and statistics. Social media dedicated channels have been created to disseminate **6G-SENSES** among the target audiences and to build an online community around the project.

The **6G-SENSES** LinkedIn [page](#) counts with **283 followers** to date. The page is continuously fed with updates on project activities, blog posts and partners' dissemination activities.

10,133	1,187	11.7%	129	223
Impressions	Clicks	Avg. CTR	New followers	Page views

Over the **6G-SENSES** last year on LinkedIn, the project page reached **10,133 impressions** and generated **1,187 clicks**. Growth was not steady: it was concentrated in two sharp spikes tied to real-world events, the November 2025 project Plenary Meeting and the June 2026 EuCNC & 6G Summit, which, together account for the large majority of the year's reach, clicks, and follower growth. The page added **129** followers and drew **223** page views over the period, with a follower base concentrated among Research, Engineering, and Education professionals — a strong match for a 6G research consortium's target audience. The clearest opportunity is posting cadence: with activity so heavily event-driven, more consistent publishing between milestones would likely smooth out the long low-engagement stretches visible in the data.

Impressions and clicks moved together throughout the period (Figure 3-3), confirming that reach was the main driver of engagement rather than content quality varying independently. November 2025 was the standout month, with **3,864 impressions** — more than four times the monthly average — coinciding with the project's 4th Plenary Meeting and a recap post that alone drew 3,516 impressions and 278 clicks. A second, even sharper peak followed in June 2026 (2,768 impressions, 524 clicks) around the EuCNC & 6G Summit in Málaga, where the page's highest click-through rate of the year (27.7%) was recorded. Between these two peaks, monthly impressions fell as low as 29–152, reflecting long gaps with no new posts rather than declining interest — the underlying engagement rate on published posts stayed healthy throughout.

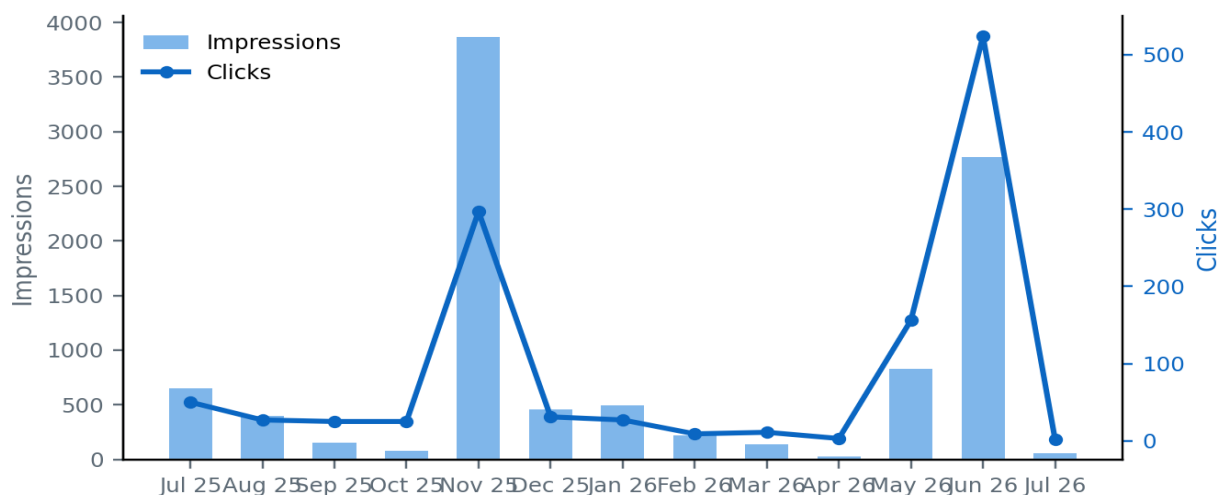


Figure 3-3 Monthly impressions (bars) and clicks (line), July 2025 – July 2026

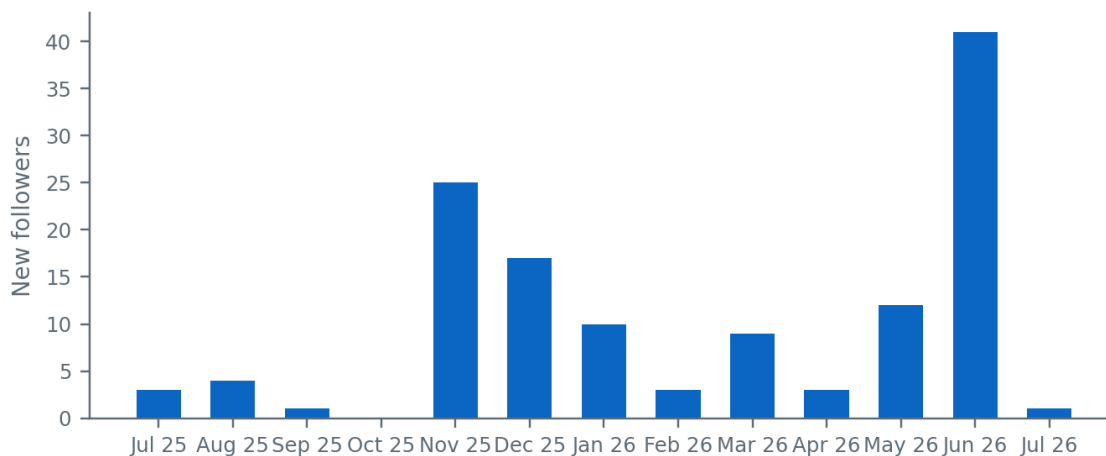


Figure 3-4 New followers gained per month, July 2025 – July 2026

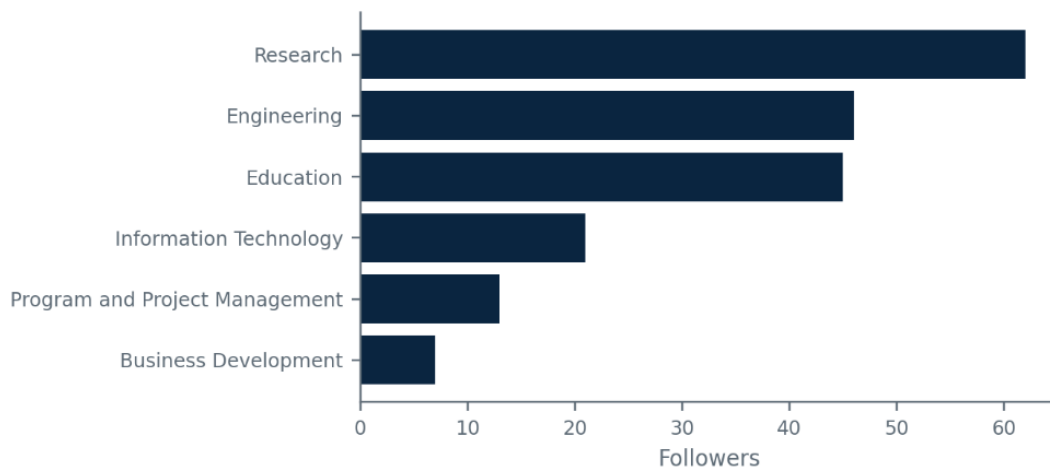


Figure 3-5 Follower base by job function, top 6 categories

Follower growth (Figure 3-4) mirrors the content reach pattern almost exactly. June 2026 was the strongest month for new followers (41, roughly a third of the year's total), immediately following the EuCNC & 6G Summit exposure, with November and December 2025 (25 and 17 followers respectively) forming the second growth cluster around the Plenary Meeting. In months without a major event or post, follower growth slowed to single digits or zero. This reinforces that, for a project page of this size, high-visibility real-world events and the posts covering them are the primary follower-acquisition channel, more so than organic reach from routine updates.

The **129 followers** gained over the period skew heavily toward the project's core target audience: Research professionals are the largest single group (62 followers), followed by Engineering (46) and Education (45), with Information Technology (21) and Program/Project Management (13) further down. This distribution — combined with follower location and industry data showing concentration in Berlin, Santander, and Athens metropolitan areas and in Higher Education, Telecommunications, and Research Services industries — indicates the page is successfully reaching the academic and technical research community central to a 6G Smart Networks and Services Joint Undertaking (SNS JU) project, rather than a broad, undifferentiated audience.

Three actions follow directly from the data. First, increase posting frequency in the gaps between major events — the near-zero activity in months like April 2026 (29 impressions) represents lost momentum that a lighter cadence of behind-the-scenes or explainer content could fill. Second, replicate the format of the two best-performing posts (event coverage with visuals and concrete technical detail) rather than general deliverable announcements, which underperformed by comparison. Third, given the strong concentration of followers in Research and Engineering roles, consider more technical, detail-rich content aimed at that audience, since it is already the page's core base and most likely to drive shares and comments.

Additionally, it should be noted that several project partners have published information about the project's scope and activities on webpages hosted on their corporate websites.

In this context, several partners maintain a dedicated webpage providing information about the project, available at the following URLs:

- **OTE**, https://www.cosmote.gr/static/corporate/en/page/6G_SENSES
- **IHP**, <https://www.ihp-microelectronics.com/research/communication-and-embedded-system-architectures/projects/6g-senses>
- **UC**, <https://web.unican.es/portal-investigador/en/projects/project-detail?pi=113326>
- **BI**, <https://www.barkhauseninstitut.org/en/6g-senses-6g-connectivity-with-radio-technologies>

3.3 Participation in 6G-related Events

This section provides a summary of the participation of the 6G-SENSES project in Events since the release of deliverable D6.2 [2].

3.3.1 EuCNC 2026

As every year, EuCNC has been the flagship conference for 6G-SENSES to contribute, showcase and liaise with the overall SNS JU framework. Being closer to the project end, we have increased the participation in the Conference and we have tried – to the extent the existing PoC deployments permit – to showcase as many 6G-SENSES technologies and integration efforts carried out within the duration of the project. Of course, this being a glimpse of what the final PoCs are proposing.

The participation has been centred in various dissemination activities: Participation in Workshops, Participation in Panels, and the 6G-SENSES Exhibitor.

3.3.1.1 Participation in Workshops

3.3.1.1.1 Workshop 2: Second Workshop on Integrated Sensing and Communications initiatives on the European research framework

As carried out the year before, i.e. for EuCNC 2025, 6G-SENSES played an active role in the organization and coordination of Workshop 2 (WS2) at EuCNC 2026. The workshop title was “Second Workshop on Integrated Sensing and Communications initiatives on the European research framework”, where Dr. Jesús Gutiérrez (IHP) was in charge of organizing expert-driven panels and discussions, promoting a holistic view of the ISAC research landscape, particularly focused on the PHY Layer Research.



Figure 3-6 Panel Chair and panellists of the PHY Layer Research on ISAC

The Panel focused on fundamental sensing-communication integration at the PHY layer and signal processing aspects. The panellists were the following:

- INSTINCT -> Angeliki Alexiou (University of Piraeus).
- 6G-DISAC -> Henk Wymeersch (Chalmers University of Technology).
- 6G-MUSICAL -> Izzat Darwazeh (University College London).
- 6G-EWOC -> J. A. Lázaro (UPC-BarcelonaTech).
- iSEE-6G -> Christos. Oikonomopoulos (IMST GmbH).
- DISCO-6G -> Marco Canil (IMDEA Networks).
- TERRAMETA -> George C. Alexandropoulos (National and Kapodistrian University of Athens).

3.3.1.1.2 Workshop 3: Rethinking Test, Measurement, and Validation for 6G Networks

This workshop will focus on consolidating and disseminating performance results from SNS JU projects, while fostering discussion of the associated challenges and of how existing approaches to testing, measurement, and validation must evolve to meet the requirements of 6G networks. The Project Coordinator, Dr. Jesús Gutiérrez (IHP) participated in the Workshop representing 6G-SENSES.

6G-SENSES presented its work on Test, Measurement and Validation activities in the session titled: “Emerging 6G Technologies and Novel TMV Frameworks”. We focused on TMV frameworks, including tools and methodologies to test 6G new capabilities like RIS, ISAC, digital twins (DTs), advanced measurement setups and experimentation environments, Cross-layer and cross-functional TMV frameworks, etc. the main outcomes of the talk were:

- Rethinking Test, Measurement and Validation for 6G Networks, within Emerging 6G Technologies and Novel TMV Frameworks
- SDR-based solutions require additional integration activities, lack of COTS “White Boxes” for facilitating ISAC implementations
- Lab-to-field continuity is key to de-risk and accelerate 6G ISAC deployment
- Shared experimentation platforms UC/IHP Open Labs used in further SNS JU actions (e.g. MultiX).



Figure 3-7 The 6G-SENSES coordinator presenting at EuCNC 2026 - Workshop 3

3.3.1.1.3 Workshop 4: Microelectronics and Photonics Hardware Challenges and Solutions towards 6G

Connected to the involvement of 6G-SENSES in the Hardware Technologies Working Group (HTWG) of the Smart Networks and Services Joint Undertaking (SNS JU), the project contributed to Workshop 4 on “Microelectronics and Photonics Hardware Challenges and Solutions towards 6G”.

The motivation for the workshop stems in the unprecedented demands on hardware technologies for 6G, requiring advances well beyond incremental scaling of previous generations. 6G introduces challenges related to energy efficiency, bandwidth, integration density, and system complexity, particularly across RF, mmWave, sub-THz, and optical domains. The SNS JU has highlighted the need for closer alignment between telecom system requirements and underlying hardware capabilities, including electronics-photonics co-design, heterogeneous integration, and advanced packaging.

The workshop addressed these challenges by bringing together leading SNS projects, research organizations, and industry to discuss:

- Microelectronics and photonics technologies for 6G devices, fronthaul and transceivers.
- RF and mixed-signal front-ends, antennas, and beamforming systems.

- Electronics-photonics co-integration and heterogeneous packaging.
- Hardware support for AI-enabled and energy-efficient 6G systems.
- Special emphasis is placed on bridging component-level innovation and system-level requirements, and on identifying realistic paths for European industrial leadership in next-generation wireless hardware.

Our 6G-SENSES colleague, Dr. Batuhan Sütbas (**IHP**), Senior Researcher and Group Leader of the Millimetre-Wave and THz Sensor Circuits research group, presented in Session I – Enabling Hardware Technologies and Integration with the talk “Low-power 60 GHz RF front-ends for ISAC”. This topic is related to the work of **IHP** and **BI** in the context of the project, highlighting energy-efficient hardware architectures that support the convergence of wireless communications and sensing in future 6G networks.

3.3.1.1.4 Workshop 11: Sustainable by Design, Sustainable in Operation: The 6G Perspective

6G-SENSES participated in a Workshop on Sustainability organised by the Sustainability WG. Experts from academia and industry explored how to embed sustainability across the entire 6G ecosystem—from technology design and deployment to lifecycle assessment, standardization, and societal impact.

The workshop highlighted the importance of holistic, end-to-end approaches that balance environmental, economic, and social sustainability while ensuring that 6G becomes a true enabler of a more sustainable digital future.

There will be a White Paper that will build on the presentations and discussions from the EuCNC 2026 workshop. The activity will be organised within the SNS Sustainability Working Group, and the 6G-SENSES WG contributors will continue participating further in the discussions.

A Technology Brief (a short white paper) entitled "Trustworthy, Sustainable, and Resilient 6G Networks" will be also prepared within the SNS Architecture Working Group, focusing on the architectural aspects of these topics.

6G-SENSES provided a contribution to Presentation 2 in the Session 1 of the Workshop with title: "Sustainable by Design, Sustainable in Operation: The 6G Perspective", particularly on the first topic focusing on sensing-assisted and AI-driven RAN operation at the radio level. How to enable human-centric and EMF-aware beam management, dynamically balancing communication performance, safety constraints, and energy efficiency in dense deployments.

3.3.1.2 Participation in Panels: Connected Intelligence: when 6G and AI meet

Our 6G-SENSES colleague and leader of the architectural concept & development in **WP2**, Prof. Anna Tzanakaki (**IASA**), acted as a panellist of the EuCNC Panel “Connected Intelligence: when 6G and AI meet”. This panel explored how these accelerating trends in AI will impact 6G and what new capabilities and performance levels expected for 6G will be able to do for AI. She discussed about AI-related work and opportunities that fall in the context of 6G-SENSES, particularly on sensing activities.



Figure 3-8 Panel “Connected Intelligence: when 6G and AI meet”

3.3.1.3 6G-SENSES Exhibitor

6G-SENSES has considered, as every year, the EuCNC and 6G Summit as the key venue for showcasing the technical activities of the project. The Consortium (Figure 3-9) made a lot of effort in bringing HW equipment to showcase different small-scale demonstrations that provide a glimpse on what the final PoC demos are.

The demonstration activities were the following:

8. Multi-technology ISAC platform (Sub-6 @n46 band, mmWave) –This demo will showcase a multi-technology ISAC platform involving different wireless access technologies, some radar-based such as the mmWave sensing solution, and the SDR-based gNB with monostatic sensing capabilities.
2. OTFS-based ISAC platform, showcasing the capabilities of an SDR-based implementation of OTFS – using an RFSoc and a COTS front-end to perform ISAC at 24 GHz.
3. Reconfigurable Intelligent Surface (RIS) video, where an optimization algorithm based on TUBS RIS framework is evaluated. The RIS dynamically adjusts its configuration based on the measured signal quality at the receiver to improve transmission performance.
4. Implementation of a Reciprocity Calibration algorithm on a Cell-Free MIMO (CF-MIMO) testbed. The goal is to compare a calibrated system with a non-calibrated setup to highlight the effects of calibration.
5. Small-scale demonstration designed to showcase the Wireless Edge Caching (WEC) capabilities developed in the 6G-SENSES project. The proposed solution is implemented through an adhoc xApp deployed on top of the RIC. This xApp executes Robot Operating System (ROS) code to collect sensing data from the Radar Sensor and seamlessly integrate it into a ROS workspace.

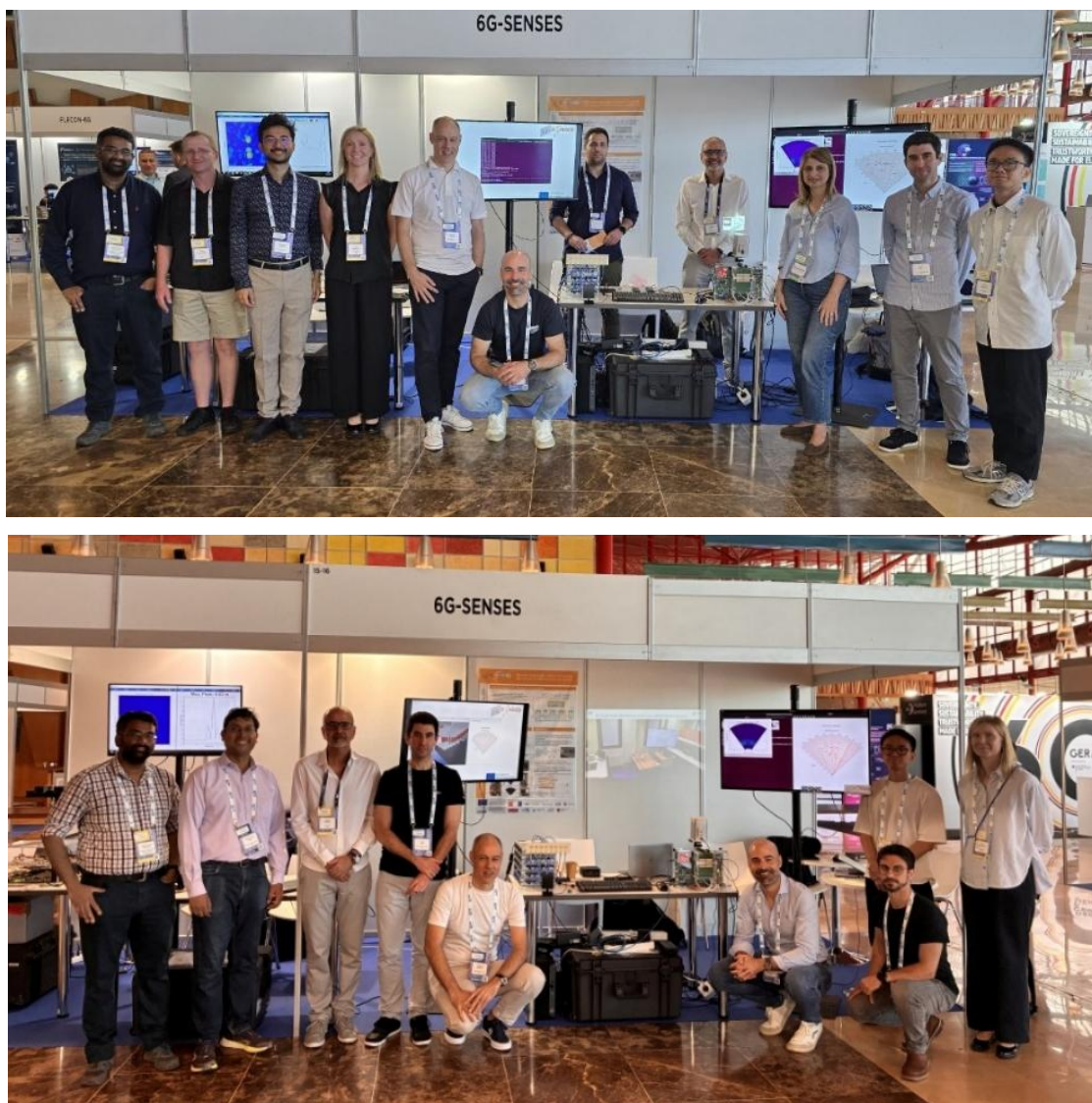
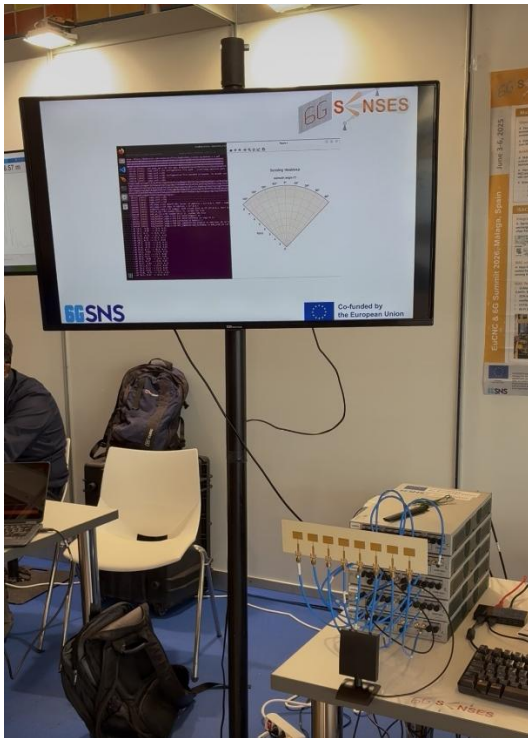
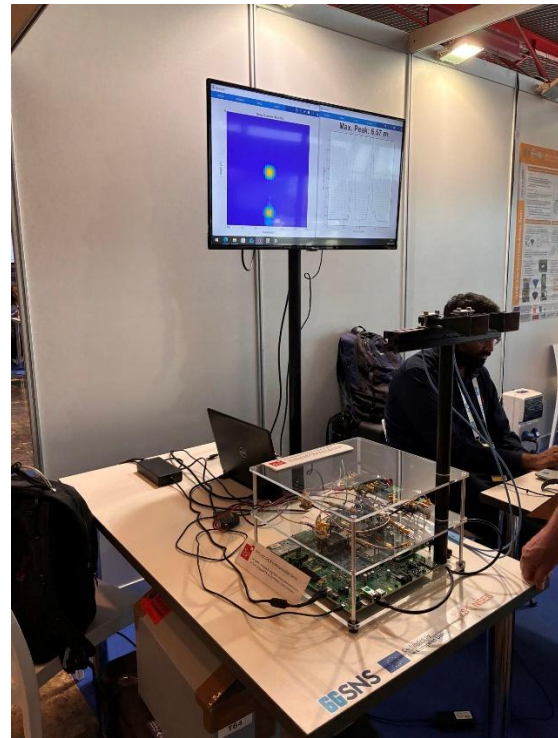


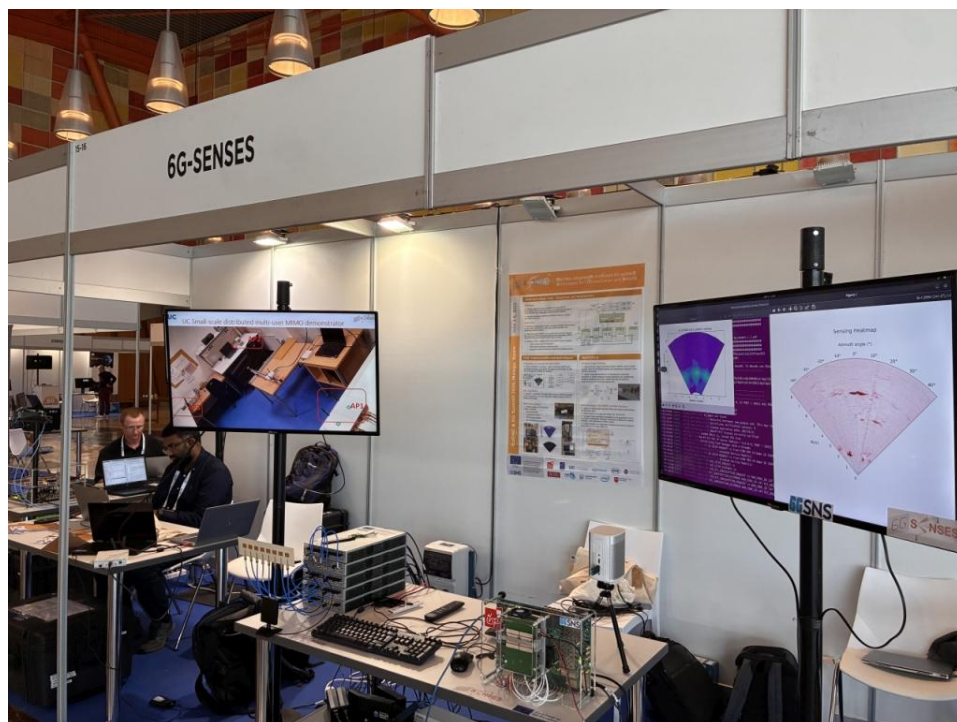
Figure 3-9 6G-SENSES Research Team @ EuCNC 2026



a)



b)



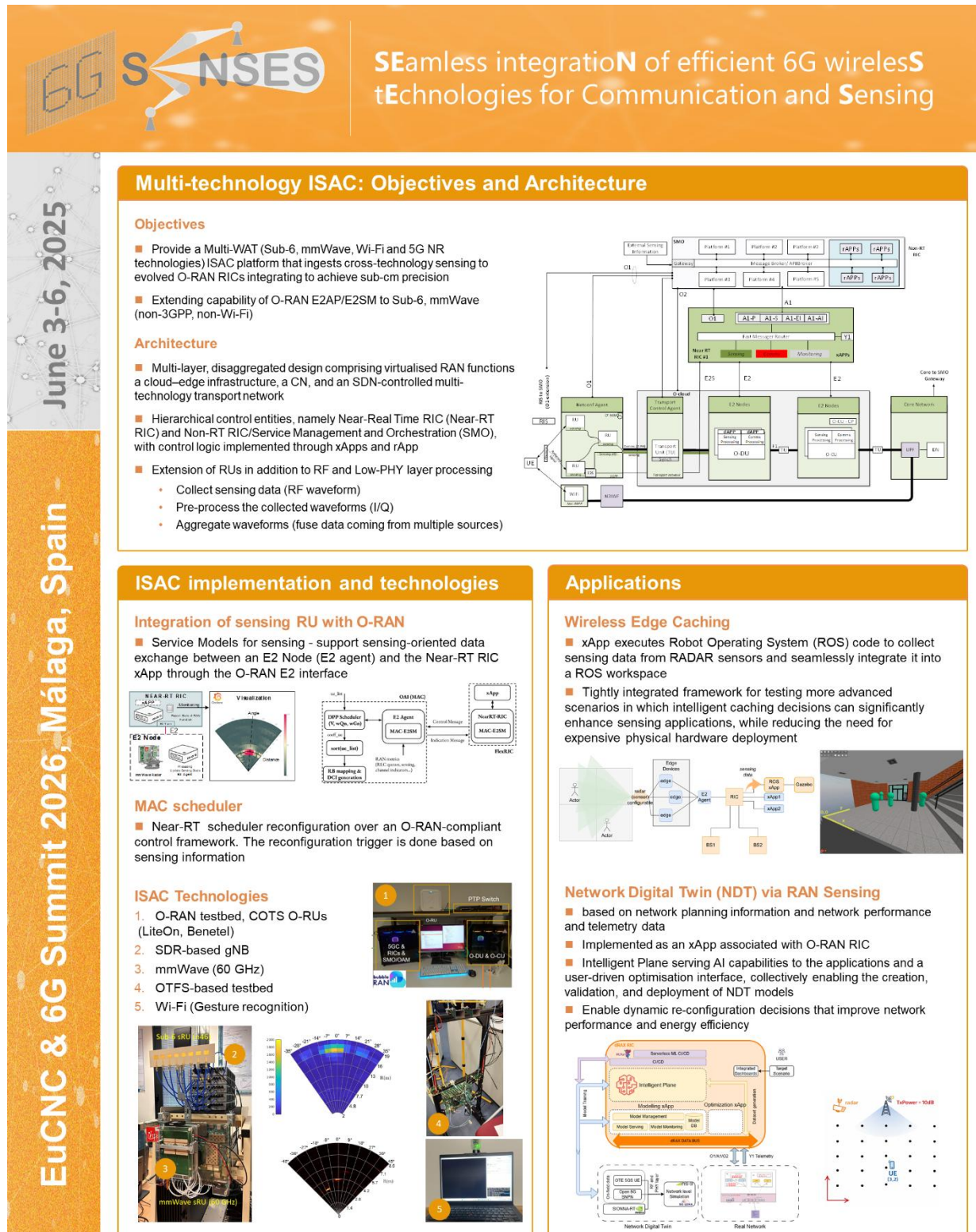
c)

Figure 3-10 6G-SENSES Technologies at the Exhibitor, a) SDR-based gNB with monostatic capabilities, b) OTFS-based demonstration at FR3, c) All technologies.



Figure 3-11 6G-SENSES Exhibitor receiving the visit of the 6G-SENSES Project Officer

3.3.1.4 6G-SENSES Poster



3.3.2 Workshop EuCAP 2026

6G-SENSES participated in a workshop at EuCAP 2026 on “Emerging mmWave and sub-THz antenna arrays: recent technological advances and applications”.

It was a very engaging session (see Figure 3-13) bringing together contributions from six outstanding speakers across multiple European projects (TERRAMETA Project, TERA6G Project, FUNTERA/SYSTERA, TeraGreen, HiCONNECTS and 6G-SENSES), covering:

- Novel bonding strategies and on-chip metasurfaces for D-band RIS.
- Photonic-enabled phased array antennas.
- Gradient and modulated metasurfaces.
- THz measurements and hardware platforms.
- 300 GHz communication links.
- ISAC/JCAS challenges and trade-offs.

The discussions highlighted how mmWave and sub-THz technologies are converging across hardware, photonics, and sensing, paving the way towards integrated 6G systems. Dr. Ahmad Sajjad, Senior Researcher at the Barkhausen Institut (BI) in Dresden, participated on behalf of 6G-SENSES.



Figure 3-13 Workshop at EuCAP 2026

3.3.3 Panel at REFRESH2026

At the end of June, Dr. Valerio Frascolla (INT) organised and chaired the panel "EU Regulations and Their Impact on 6G Networks and Terminals" at the 6th International Workshop on Real-life Modeling in 5G/6G Networks and Beyond ([#REFRESH2026](#)).

The workshop was organized as part of the International Conference on Distributed Computing in Smart Systems and the Internet of Things ([#DCOSSIoT](#)), held on 22–24 June 2026 in Reykjavik, Iceland.



Figure 3-14 Panel starting slide



Figure 3-15 Panel participants together with the organiser

The Panel, attended by around twenty people, entailed a presentation from Dr. Frasca touching on the impact of European regulation on system design and an open discussion with the audience during a Panel session that featured Dr. Fabian Götsch and Dr. Akis Kourtis, PhD as panelists. The session focused on helping system engineers and 6G technical experts better understand how EU regulations, including the AI Act, Data Act, Cybersecurity Act, and Cyber Resilience Act, influence system design activities.

6G-SENSES project was among the organizing EU-funded projects, working in synergy with [MultiX-6G Project](#), [O-CEI Horizon](#), and [6GARROW](#).

3.3.4 Tutorial at GLOBECOM 2025

Our colleagues from University of Cantabria ([UC](#)), Prof. Ramón Agüero and Luis Díez were the organizers and speakers of a Tutorial at GLOBECOM 2025 on "Leveraging O-RAN and ISAC for Sensing-aware Radio Resource Management in 6G networks". The tutorial focused on the convergence of two of the most important 6G research directions for 6G-SENSES:

- O-RAN, providing an open, programmable and AI-enabled RAN architecture.
- ISAC, where the network performs communication and environmental sensing simultaneously.

The key idea was that sensing information (user position, environment, mobility, obstacles, etc.) can be exploited by the RAN Intelligent Controller (RIC) to make smarter radio resource management (RRM) decisions. The tutorial is strongly aligned with the research the **UC** has been publishing in the European 6G-SENSES project, including work on:

- O-RAN fronthaul performance analysis,
- XR-aware scheduling,
- O-RAN architectures,
- integration of sensing capabilities into future 6G networks.

Rather than treating sensing as an independent service, the tutorial argues that RRM in 6G should become sensing-aware. Information generated by ISAC can be fed into O-RAN intelligence (especially the Near-RT RIC and AI applications) to improve network efficiency, reliability, and support new services such as autonomous systems, XR, and digital twins (DTs).

3.3.5 Poster Presence at INFOCOM World Athens 2025

The 27th Infocom World 2025 Conference, held in Athens on 26 November 2025 under the theme "AI-Volution – A Brave New World", brought together a large number of ICT experts and industry stakeholders in Greece. As part of the event, the **OTE** Group, through its R&D Subdivision organised the scientific workshop "Facing AI Challenges and Opportunities in Beyond 5G / 6G Era: New Perspectives in the European R&D." In the context of the event, Prof. Anna Tzanakaki from **IASA**, and Ioanna Mesogiti from **OTE**, represented **6G-SENSES** at a poster session co-located with the Workshop, and had the chance to exchange views, to engage in interesting discussions and present the project objectives, work and results.



Figure 3-16 6G-SENSES at the Poster session at INFOCOM World Athens 2025

3.4 Scientific Dissemination

The **6G-SENSES** Consortium has kept always in mind the research nature of the project and has been actively involved in scientific dissemination. Table 3-2 provides a detailed list of publications that either have been published already, accepted or they currently undergo a review process.

Table 3-2 Scientific Dissemination during the second reporting period

Pub #No	Author	Title	Venue	Date	Status	Partner(s)
35	M. Anastasopoulos, J. Gutiérrez, A. Tzanakaki	Optical Transport Network Optimization Supporting Integrated Sensing and Communication Services	OFC 2025	April 2025	Published	IASA , IHP
36	F. Trombetti, V. Arrigoni, N. Bartolini	Distributed Network Tomography for Failure Localization	IEEE INFOCOM 2025 - IEEE Conference on Computer Communications	May 2025	Published	UNIROMA1
37	A. Tzanakaki, M. Anastasopoulos, V. Alevizaki and A. Manolopoulos	Optical Networking in Support of 5G and 6G Infrastructures	2025 International Conference on Optical Network Design and Modeling (ONDM)	May 2025	Published	IASA
38	M. Soleymani, E. Jorswieck, R. Schober, L. Hanzo	A Framework for Fractional Matrix Programming Problems With Applications in FBL MU-MIMO	IEEE Transactions on Wireless Communications	July 2025	Published	TUBS
39	M. Anastasopoulos, A. Tzanakaki, Y. Jian, L. Lopacinski, J. Gutiérrez, I. Mesogiti, E. Theodoropoulou, and G. Lyberopoulos	Demonstration of Multi-technology 6G Transport network Integrating THz and Optical Network Technologies Empowered by Federated Learning	IEEE/OSA J. Opt. Commun. Netw.	July 2025	Published	IASA , IHP , OTE
40	B. Sutbas, M. H. Eissa, S. Dilek, C. Carta, G. Kahmen	A 38–96 GHz Bi-Phase Amplitude Modulator With 2.9 dB Insertion Loss Using Deep-Saturated HBTs	IEEE Microwave and Wireless Technology Letters (MWTL)	September 2025	Published	IHP
41	F. Trombetti, N. Bartolini, S. Pontarelli	Sensing at the Edge: Location-Aware Caching	21st IEEE International Conference on Network and Service Management (CNSM)	October 2025	Published	UNIROMA1
42	A. Tzanakaki, M. Anastasopoulos	Optical Transport Networks Supporting Integrated Communications and Sensing in 6G	2025 European Conference on Optical Communications (ECOC)	October 2025	Published	IASA
43	F. Khan, O. Gil, L. Diez, E. Serna, R. Agüero	On the delay of O-RAN Fronthaul: A methodology based on Generalized Jackson Network	IEEE Global Communications Conference (GLOBECOM'25)	December 2025	Published	UC
44	N. Villegas, A. Larrañaga, L. Diez, K. Koutlia, S. Lagen, R. Agüero	Lyapunov-Based PDU Set-Aware Scheduling for XR Traffic in 5G-Advanced Networks	IEEE Global Communications Conference (GLOBECOM'25)	December 2025	Published	UC
45	J. Sanson, R.C. Shah, M. Pinaroc, V. Frascolla	Extracting Range-Doppler Information of Moving Targets from Wi-Fi Channel State Information	IEEE Global Communications Conference (GLOBECOM'25)	December 2025	Published	INT
46	B. Peng, et al.	RIS-Assisted NOMA with Partial CSI and Mutual Coupling: A Machine Learning Approach	IEEE Global Communications Conference (GLOBECOM'25)	December 2025	Published	TUBS
47	I. Floudas, M. Anastasopoulos, A. Tzanakaki, and J. Gutiérrez	Experimental evaluation of semantic communications for 6G networks in railway	IEEE Communications Standards Magazine	December 2025	Published	IASA , IHP

		systems				
48	M. Soleymani, A. Zappone, E. Jorswieck, M. D. Renzo and I. Santamaria	Spectral–Energy Efficiency Tradeoff of Nearly-Passive RIS in MIMO URLLC Downlink: Diagonal Versus Beyond Diagonal	IEEE Wireless Communications Letters	December 2025	Published	TUBS, UC
49	Y. Zhu, R. Shah, M. Pinaroc, V. Frasca	AI-Driven Human Wi-Fi Sensing with Hierarchical Architecture and Breathing Detection	Pervasive Computing (PerCom) / 3rd Int. Workshop on Pervasive Wireless Sensing and Edge Computing (WISENSE)	March 2026	Accepted	INT
50	J. Sanson, R.C. Shah, V. Frasca	Human Presence Detection via Wi-Fi Range-Filtered Doppler Spectrum on Commodity Laptops	Pervasive Computing (PerCom) / 3rd Int. Workshop on Pervasive Wireless Sensing and Edge Computing (WISENSE)	March 2026	Accepted	INT
51	J. Sanson, R. Shah, M. Pinaroc, V. Frasca, C. Tanriover	LiveSense: A Real-Time Wi-Fi Sensing Platform for Range–Doppler on COTS Laptop	Pervasive Computing (PerCom) / Demos	March 2026	Accepted	INT
52	Y. Zhu, R. Shah, V. Frasca	OFDM-Based mmWave Wi-Fi ISAC System Implementation for Monostatic Human Sensing	'20th European Conference on Antennas and Propagation (EuCAP)	April 2026	Accepted	INT
53	I. Santamaria, M. Soleymani, E. Jorswieck, J. Gutierrez, C. Beltran	Riemannian optimization on the manifold of unitary and symmetric matrices with application to BD-RIS as-system systems	IEEE ICASSP 2026	May 2026	Accepted	UC, TUBS, IHP
54	F. Khan, L. Diez, N. Maltic, M. Petri, J. Gutiérrez, R. Agüero	ISAC meets O-RAN: a RIC service to ensure sensing delay requirements	IEEE International Conference on Communications (ICC'26)	May 2026	Accepted	UC, IHP
55	I. Floudas, C. Pallis, M. Anastasopoulos, J. Gutierrez, and A. Tzanakaki	Experimental Evaluation of Control-Based Beamforming for Interference Mitigation in O-RAN	IEEE Joint European Conference on Networks and Communications & 6G Summit (EuCNC/6G Summit)	June 2026	Published	IASA, IHP
56	P. Nowitzki and T. Kürner	Beamforming as a Method to Reduce Interference Between 5G NR-U and Wi-Fi Under Co-Channel Operation in the 6 GHz Band	IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)	July 2026	Accepted	TUBS
57	J. Sanson, R. Shah, Y. Zhu, R. Rosales, V. Frasca	WiRD-Gest: Gesture Recognition In The Real World Using Range-Doppler Wi-Fi Sensing on COTS Hardware	IEEE International Conference on Communications (ICC'26)	May 2026	Published	INT
58	Y. Zhu, R. C. Shah, U. Parker, V. Frasca	Interference Leakage Impact on Monostatic mmWave Sensing: OFDM vs FMCW Performance with Practical 40 dB Isolation at 60 GHz	IEEE Joint European Conference on Networks and Communications & 6G Summit (EuCNC/6G Summit)	June 2026	Published	INT
59	E. Jorswieck, M. Soleymani, I. Santamaria, and J. Gutiérrez	Physics-Compliant Three-Hop RIS Models: Specular Component and Ping-Pong	International Conference on Mobile and Miniaturized Te-	June 2026	Accepted	TUBS, UC, IHP

		Effect	<i>rahertz Systems (ICMMTS) 2026</i>			
60	F. Trombetti, N. Bartolini, S. Pontarelli	Simulation of Integrated Sensing and Communication Applications in IoT Environments	IEEE INFOCOM 2026 Workshop on Integrated Sensing and Communication (ISAC)	June 2026	Submitted	UNIROMA1
61	F. Trombetti, N. Bartolini, S. Pontarelli	Demo: Simulating ISAC Applications in Robotics and Cyber-Physical IoT Environments	IEEE INFOCOM 2026 - IEEE Conference on Computer Communications: Demo - Demo Papers	June 2026	Submitted	UNIROMA1
62	M. Özates, M. Kazemi, G.Liva, D. Gündüz	Fully Asynchronous Un-sourced Random Access over Fading Channels	2026 IEEE 103rd Vehicular Technology Conference: VTC2026-Spring	June 2026	Submitted	IHP
63	I. Santamaria, M. Soleymani, J. Gutiérrez, and E. Jorswieck	Optimal symmetric low-rank BD-RIS configuration maximizing the determinant of a MIMO link	IEEE Transactions on Signal Processing	April 2026	Submitted	UC, TUBS, IHP
64	I. Santamaria, C. Beltrán, E. Jorswieck, M. Soleymani and J. Gutiérrez	The manifold of unitary and symmetric matrices: characterization, Riemannian optimization and application to BD-RIS design	IEEE Transactions on Signal Processing	April 2026	Submitted	UC, IHP
65	X. Ding, I. Santamaria, E. Jorswieck	Efficient Pareto-Optimal Distributed ISAC Beamforming via Subspace Projections	IEEE Signal Processing Letters	June 2026	Submitted	TUBS, UC
66	P. Doanis, M. Anastasopoulos, and A. Tzanakaki	Hierarchical Deep Reinforcement Learning for ISAC-Enabled Slice Orchestration	2026 IEEE International Conference on Cloud Networking (CloudNet)	June 2026	Submitted	IASA
67	D. Raja Kumar, M. Özates, Y. J. D. Kim, D. Vargas, O. Dizdar, F. E. Kadan, C. Antón-Haro, S.Wagner, B. Clerckx, Malte Schellmann, Xavier Mestre, H. M. Furqan, K. Abela, S. Abidrabu	ETSI ISG MAT: Bridging Multiple Access Techniques Research and 6G Standardisation	IEEE Conference on Standards for Communications and Networking (IEEE CSCN)	July 2026	Submitted	IHP
68	A. Tzanakaki and M. Anastasopoulos	Optical Switching enabling Integrated Sensing and Communication Services in 6G Networks	IEEE/Optica Journal of Optical Communications and Networking	July 2026	In press (invited)	IASA
69	A. Tzanakaki, M. Anastasopoulos, VM. Alevizaki, P. Doanis, G. Kaponis and I. Chochliouros	Optical Transport Network for Integrated Communications and Sensing Services using Agentic AI	IEEE/Optica Journal of Optical Communications and Networking	July 2026	Accepted (invited)	IASA, OTE
70	I. Mesogiti, E. Theodoropoulou, G. Lyberopoulos, F. Setaki, M. Anastasopoulos, A. Tzanakaki, J. Gutierrez, G. Castellanos, E. Jorswieck, L. Diez, V. Frascolla, N. Nikaein	A Methodology for the Technoeconomic Assessment of ISAC-Enabled Network Deployments	Conference Artificial Intelligence Applications and Innovations. AIAI 2026, 5G-PINE Workshop	July 2026	Published	OTE

A summary of the scientific dissemination activities throughout the duration of the project is provided in Table 3-3.

Table 3-3 Summary of scientific dissemination

	Published	Accepted	In review process	Total
Conference Publications	28	8	5	41
Journal Publications	23	2	4	29
				70

4 Liaison Activities report

6G-SENSES partners and delegates have been active in collaboration with other SNS JU and 6G IA projects given the framework of collaboration (Collaboration Agreement) that has been signed by the consortium. In such framework the information exchange and other sorts of interactions with peer projects are easily achievable. **6G-SENSES** consortium is experienced as they have been active in the community for the past years in 5GPPP projects. Active liaison with SNS and 5G-PPP activities, and the interactions with other projects within this framework is led by the Project Manager from **6G-SENSES** side.

The project has representation in the Steering Board (Coordinator and Project Manager), and Technology Board (Technical Coordinator and Project Manager) and contribute fully to the actions emanating from these fora.

4.1 Interactions with SNS JU Work Structures

Table 4-1 lists the updated participation of **6G-SENSES** Project Coordinator and Technical Manager to the main 6G-IA boards. Table 4-2 lists the **6G-SENSES** participants that contribute actively to each of the 6G-IA/SNS JU WGs.

Table 4-1 6G-SENSES participation in SB and TB

Board	Partners	Contributors
SNS Steering Board (SB)	IHP, NTU	Jesús Gutiérrez (IHP), Shahid Mumtaz (NTU)
SNS Technology Board (TB)	NTU, IHP	Shahid Mumtaz (NTU), Jesús Gutiérrez (IHP)

Table 4-2 6G-SENSES Contributors to the different WGs established by the 6G-IA

Group / WG	6G-IA OR SNS JU	Partners	Contributors
SNS Steering Board	N/A	IHP, NTU	Jesús Gutiérrez (IHP), Shahid Mumtaz (NTU)
SNS Technology Board	N/A	NTU, IHP	Shahid Mumtaz (NTU), Jesús Gutiérrez (IHP)
6G Architecture WG	SNS JU	IASA, OTE, INT, IHP	Anna Tzanakaki (IASA), Ioanna Mesogiti (OTE), Valerio Frascolla (INT), Jesús Gutiérrez (IHP)
Spectrum WG	6G-IA	IHP, INT, TUBS	Jesús Gutiérrez (IHP), Yazhou Zhu (INT), Thomas Kürner (TUBS), Ioanna Mesogiti (OTE)
Trials WG	6G-IA	INT, IHP	Valerio Frascolla (INT), Jesús Gutiérrez (IHP)
SNS/ 6G-IA Vision and Societal Challenges WG	6G-IA	OTE, INT, IASA, IHP	Ioanna Mesogiti (OTE), Valerio Frascolla (INT), Anna Tzanakaki (IASA), Jesús Gutiérrez (IHP)
Societal Needs and Value Creation (SNVC)	6G-IA Sub-WG under Vision WG	OTE	Ioanna Mesogiti (OTE)
Business Validation, Modelling and Ecosystems (BVME-Sub WG)	6G-IA Sub-WG under Vision WG	OTE, INT	Ioanna Mesogiti (OTE), Valerio Frascolla (INT),

Sustainability WG	SNS JU	IHP	Jesús Gutiérrez (IHP)
Hardware Technologies (HT) WG	SNS JU	IHP, INT	Jesús Gutiérrez (IHP), Jessica Sanson (INT)
Test, Measurement and KPIs Validation	SNS JU	OTE	Ioanna Mesogiti (OTE)
Pre-Standardization	6G-IA	INT	Yazhou Zhu (INT)
Software Networks	SNS JU	UC	Ramón Agüero (UC)

4.2 Interaction with other SNS JU Actions

4.2.1 6G Webinar together with 6G-MUSICAL and 6G-PATH

On 19 May 2026, 6G-SENSES partnered with the projects 6G-MUSICAL (organizer) and 6G-PATH in providing an open Webinar entitled: “The 6G trial landscape: From foundational #research to sensing-enabled real-world validation” (see Figure 4-1). The 90-minute session explored how different layers of the 6G ecosystem involving ISAC converge. Three project-wide presentations on ISAC were provided, one per project and, finally, a Panel on lessons learned and future impact took place.

- Technology trials & ISAC innovation (6GMUSICAL).
- Sensing-driven research & validation (6GSENSES).
- Vertical pilots & ecosystem trials (6GPATH).
- Joint #panel discussion on lessons learned and future #impact.



Figure 4-1 ISAC Webinar organised by 6G-MUSICAL

4.3 Achievements and Impact

6G-SENSES has declared from the project starting date its degree of involvement in most WGs that are currently running, either triggered by the 6G IA or the SNS JU.

We list in the following tables the activities that have taken place in the WGs and the future plans that are of interest for the project. As mentioned in [1], the criteria for choosing these responsible people stem from their general expertise working at their organisations, together with previous expertise in driving and contributing to the mentioned WGs.

4.3.1 SB/TB activities

Activities and Achievements:	
Activities • 6G-SENSES contributed to the SB Key Achievements • 6G-SENSES contributed to the SNS JU Annual Activity Report. • 6G-SENSES contributed to the SNS JU Annual Journal 2025. • 6G-SENSES contributed to the SB request for feedback on policies. The 6G-SENSES project also provided insights on policy aspects responding to a relevant request from the SNS JU SB in December 2025. The project identified two major policy challenges: the lack of a clear regulatory framework for sharing ISAC-generated data among multiple stakeholders, and the economic sustainability of the ultra-dense network deployments required to meet 6G performance targets. To address these challenges, 6G-SENSES recommended that EU policymakers launch early multi-stakeholder dialogues on both ISAC data governance and future RAN infrastructure sharing models, helping create a predictable regulatory environment that encourages innovation, investment, competition, and commercial deployment of 6G technologies.”	

4.3.2 Vision and Societal Challenges

Association:	6G-IA
Working Group:	Vision and Societal Challenges WG
Representatives on behalf of 6G-SENSES	Anna Tzanakaki (IASA), Jesús Gutiérrez (IHP), Ioanna Mesogiti (OTE), Valerio Frascaola (INT)
Activities and Achievements:	
Activities The Societal Needs and Value Creation Sub-WG (SNVC-Sub-WG of the VSC WG) focuses on refining the methodology that has been inherited by 5G-IA WG and Hexa-x II (to be followed by SNS-JU projects) for identifying, defining, measuring and validating the impact of 6G use cases on Key values and deriving KVis. 6G-SENSES representatives follow up the meetings and the work of the Sub-WG. The project representatives followed the SNVC WG activities over the course of the project and adopted the methodology that was developed by the WG for the definition of the 6G-SENSES KVis.	

4.3.3 WG Vision Business (sub-group of that in 4.3.2)

Association:	6G-IA
Working Group:	WG Vision Business – BVME SG - Business Validation, Models, Ecosystems
Representatives on behalf of 6G-SENSES:	Ioanna Mesogiti (OTE), Valerio Frascaola (INT)
Activities and Achievements:	
Activities • The group is working on the business validation of B5G and 6G technologies, and on business modeling and economical aspects of the deployment of B5G and 6G technologies and use cases. 6G-SENSES participates to the meetings of the WG and contributes to the formulation of the views based on the relevant work of the project (i.e. the vision on 6G-Ecosystems, the technoeconomic studies etc.).	
Achievements	

- The group published the White Paper “Emerging 5G and beyond ecosystem business models”¹, where Ioanna Mesogiti (OTE) was one of the lead editors and Valerio Frasca (INT) served as reviewer. The main contribution has been the views of 6G-SENSES on how 5G-Ecosystems will evolve to 6G-Ecosystems, and how technoeconomics can influence the business models’ formulation.
- The group published the White Paper “B5G Service Framework”, where -on behalf of 6G-SENSES - Ioanna Mesogiti (OTE) participated in the regular virtual meetings and Valerio Frasca (INT) served as reviewer.

4.3.4 6G Architecture WG

Association:	SNS JU
Working Group:	6G Architecture WG
Representatives on behalf of 6G-SENSES:	Anna Tzanakaki (IASA), Jesús Gutiérrez (IHP), Simon Pryor (ACC), Valerio Frasca (INT).
Activities and Achievements:	
Activities • Participation in an Industry session propose to IEEE Future Networks World Forum, 26–28 October 2026 on ISAC along with some of the WG participants.	
Achievements • Participation and contribution of the White Paper “TOWARDS 6G ARCHITECTURE: KEY CONCEPTS, CHALLENGES, AND BUILDING BLOCKS”, published on May 2025, with the contributions from 6G-SENSES D2.2.	

4.3.5 Test, Measurement and KPIs Validation

Association:	SNS JU
Working Group:	WG Test, Measurement and Validation – KPIs Task Force
Representatives on behalf of 6G-SENSES:	Ioanna Mesogiti (OTE)
Activities and Achievements:	
Activities	
KPIs Sub-WG: • Ioanna Mesogiti is leading the Sub-WG. 6G-SENSES participated in the Sub-WG teleconferences, and co-edited and contributed to the latest White Paper by reporting and promoting the view of the project on the definitions and target values of the ITU-R IMT-2030 KPIs for New and Enhanced capabilities. • 6G-SENSES also contributed to the dissemination activities of the Sub-WG (Presentation of the work on TMV KPIs WG in the Hexa-x II series workshop in EUCNC 2025).	
KVIs Sub-WG: • 6G-SENSES participated to the KVIs Sub-WG telcos and contributed to the latest White Paper by harmonizing with the WG methodology and reporting on the project KVIs.	
Achievements • Contribution and Editorship of a White Paper published on “6G KPIS –DEFINITIONS AND TARGET VALUES”, Ioanna (OTE) Editor + Contributor, Jesús Gutiérrez (IHP), link • Contribution to KVIs identification from 6G-SENSES, Ioanna (OTE) Contributor/Reviewer. White Paper “6G KVIs – SNS PROJECTS INITIAL SURVEY RESULTS 2025”, link	

¹ H. K. Hallingby, R. Frizzell I. Mesogiti, “Emerging 5g and beyond ecosystem business models”, January 2025, <https://zenodo.org/records/14756405>

4.3.6 Trials Working Group

Association:	6G IA
Working Group:	Trials Working Group
Representatives on behalf of 6G-SENSES:	Valerio Frascolla (INT), Jesús Gutiérrez (IHP)
Activities and Achievements:	
Activities - The Trials and Pilots (T&Ps) WG syncs and steers the activities related to Pilots and Trials among all SNS JU running projects. Achievements - SNS T&Ps Brochure N°1 produced in June 2025. - Jesús Gutiérrez (IHP), on behalf of the whole project and aligning with consortium partners, contributed to the white paper “Large-Scale Trials and Pilots (LST&Ps)”, released at the EuCNC & 6G Summit 2026 in Málaga in June 2026.	
Future Plans:	
- Preparation of a White Paper on Large-Scale Trials and Pilots (LST&Ps), with a planned release date at EuCNC & 6G Summit 2026. - Opt to get accepted our PoC activities in the next release of the Trials & Pilots (T&Ps) document.	

4.3.7 Pre-standardisation WG

Association:	6G-IA
Working Group:	Pre-standardisation WG
Representatives on behalf of 6G-SENSES:	Yazhou Zhu (INT)
Activities and Achievements:	
Activities - Feedback to the WG on the standardization activities stemming from 6G-SENSES. Achievements - Yazhou Zhu (INT) attended the WG meetings, reporting on the advancement on the standardization-related activities of 6G-SENSES.	

4.3.8 Spectrum WG

Association:	6G-IA
Working Group:	Spectrum WG
Representatives on behalf of 6G-SENSES:	Yazhou Zhu (INT), Jesús Gutiérrez (IHP), Thomas Kürner (TUBS), Ioanna Mesogiti (OTE)
Activities and Achievements:	
Activities 6G-SENSES (through the collaborative work of its’ representatives) was the major contributor to the definition and target values of the “sensing-related KPIs” which were included (in an abstracted way) in the document contribution of the 6G-IA Spectrum WG to ITU-R. - The WG representatives attended the telcos regularly. Achievements - Contribution on "Minimum requirements related to technical performance for IMT 2030 radio interface(s)" submitted to ITU-R (link)	

- **6G-SENSES** provides its project views on the Minimum Technical Performance Requirements (TPR) related to sensing.

4.3.9 Hardware Technologies WG

Association:	6G-IA
Working Group:	Hardware Technologies WG
Representatives on behalf of 6G-SENSES:	Jessica Sanson (INT), Jesús Gutiérrez (IHP)
Activities and Achievements:	
Activities & Achievements Contributed to Workshop 4 on “Microelectronics and Photonics Hardware Challenges and Solutions towards 6G” with a presentation on “Low-power 60 GHz RF front-ends for ISAC”, connected with the work IHP and BI have carried out together in the project.	

4.3.10 Sustainability WG

Association:	SNS
Working Group:	Sustainability WG
Representatives on behalf of 6G-SENSES:	Jesús Gutiérrez (IHP)
Activities and Achievements:	
Activities - Editorship and Contribution to a White Paper entitled “Sustainability in SNS JU Projects – Targets, Methodologies, Trade-offs and Implementation Considerations Towards 6G Systems”, Jesús Gutiérrez (IHP) Achievements 6G-SENSES participated in the EuCNC Workshop “Sustainable by Design, Sustainable in Operation: The 6G Perspective”, organized by the Sustainability WG. 6G-SENSES was present in Session 1 of the Workshop with title: “Multi-Layer Sustainability in 6G: From Energy-Neutral Devices to Human-Centric and TN–NTN Networks”, particularly on the first topic focusing on sensing-assisted and AI-driven RAN operation at the radio level.	

4.3.11 Reliable Software Network WG

Association:	SNS
Working Group:	Reliable Software Network WG
Representatives on behalf of 6G-SENSES:	Ramón Agüero (UC)
Activities and Achievements:	
Achievements 6G-SENSES contributed to the White Paper entitled: “The AI/ML landscape for Smart Networks and Services (January 2026)” from the WG.	

5 Conclusions

6G-SENSES demonstrated a concrete, continuous and broad impact on the research and industrial ecosystem with inputs coming from the technical work packages and from the work of each partner.

All committed KPIs as reported in the DoW were met (see Table 3-1), an impact on SDOs was demonstrated, liaisons and driving activities with the SNS Ju were performed.

The **6G-SENSES** team, thanks to the complementary expertise and the very good co-work in the 30 months of project lifetime, managed to improve considerably the knowledge of all partners involved in the project, each one in its own area of interest. The consortium managed to impact the research ecosystem with a high number of papers and presentation to conferences, including workshops and videos, and to SDOs via the several documents presented.

Overall, consortium partners are happy about the project outcome and hope that the project stakeholders will benefit from the output of the project, to enhance the European and more generally the worldwide understanding of the impact that a converged approach to sensing in communication and computation can bring to the everyday life of people on earth.

6 References

- [1] 6G-SENSES Deliverable D6.1, "6G-SENSES Standardisation, Dissemination, Communication, and Liaison Activities Plan", September 2024, https://6g-senses.eu/wp-content/uploads/2025/02/2024-09-30-6G-SENSES_D6_1_vf_pending_EU_review.pdf
- [2] 6G-SENSES Deliverable D6.2, "D6.2 Preliminary Standardisation, Dissemination, Communication and liaison Activities Report", September 2025, [link](#).
- [3] Y. Zhu, R. Shah, V. Frasca, "OFDM-Based mmWave Wi-Fi ISAC System Implementation for Monostatic Human Sensing" in *Proc. of the 20th European Conference on Antennas and Propagation (EuCAP)*, 19-24.04.2026, Dublin, Ireland.
- [4] Y. Zhu, R. C. Shah, U. Parker and V. Frasca, "Interference Leakage Impact on Monostatic mmWave Sensing: OFDM vs FMCW Performance with Practical Passive Isolation," in *Proc. of the 2026 Joint European Conference on Networks and Communications & 6G Summit (EuCNC/6G Summit)*, Málaga, Spain, 2026, pp. 405-410, doi: 10.1109/EuCNC/6GSummit68295.2026.11577446.
- [5] 6G-SENSES deliverable D2.1, "Report on 6G-SENSES use cases, network architecture, KPIs and supported RAN functions", September 2024.
- [6] 6G-SENSES deliverable D2.2, "System architecture and preliminary evaluations", March 2025.

7 Acronyms

Acronym	Description
3GPP	3rd Generation Partnership Project
3GPP SA1	Service and System Aspects WG
6G-IA	6G Infrastructure Association
6GIG	GSA 6G Joint Working Group
ADRF	Analytics Data Repository Function
AI	Artificial Intelligence
AoA	Angle of Arrival
Bol	Bodies of Interest
CN	Core Network
CNN	Convolutional Neural Network
DL	Downlink
DMRS	Demodulation Reference Signal
DoW	Description of Work
EC	European Commission
ENISA	EU Network and Information Security Agency (Cyber-security Agency)
ETSI	European Telecommunication Standardization Institute
EVM	Error Vector Magnitude
FR	Frequency Range
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IMMW	Integrated MilliMeter Wave
IMS	IP Multimedia Subsystem
IoT	Internet of Things
ISA	International Society of Automation
ISAC	Integrated Sensing and Communication
ISG	Industry Specification Group
ISO	International Standard Organization

ITU	International Telecommunication Union
JU	Joint Undertaking
KPI	Key Performance Indicator
LAN	Local Area Network
LCS	Location Services
MAC	Medium Access Control
MAT	Multiple Access Techniques
MEC	Multi-access Edge Computing
ML	Machine Learning
MLP	Multi-Layer Perceptron
MTLF	Model Training Logical Function
NDP	Null Data Packet
NFV	Network Functions Virtualization
NGMN	Next Generation Mobile Networks Alliance
NOMA	Non-Orthogonal Multiple Access
NTN	Non-Terrestrial Network
NWDAF	Network Data Analytics Function
OMA	Orthogonal Multiple Access
O-RAN	Open Radio Access Network
OSM	Open Source Manual Orchestration
PA	Power Amplifier
PHY	Physical Layer
PoC	Proof of Concept
PRU	Probing Unit
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
QoE	Quality of Experience
RAN	Radio Access Network
RAN / RAN 1 / RAN 2, etc.	Radio Access Network (Layer1....)

RS	Reference Signal
RSMA	Rate Splitting Multiple Access
SB	Steering Board
SDN	Software Defined Networking
SDMA	Space Division Multiple Access
SDO	Standard Development Organisation
SEO	Search Engine Optimization
SINR	Signal-to-Interference-plus-Noise Ratio
SNR	Signal-to-Noise Ratio
SNS JU	Smart Networks and Services Joint Undertaking
SRS	Sounding Reference Signal
TF	Task Force
UL	Uplink
VAE	Variation Autoencoder
VQVAE	Vector Quantized Variation Autoencoder
WG	Working Group
WP	Work Package