



## 5G DEPLOYMENT FOR SMART INDUSTRY USAGE

CALL: BREITBAND AUSTRIA 2030: GIGAAPP

THEME: DIGITIZATION & BROADBAND

PROJECT TYPE: COOPERATIVE R&D PROJECT

PROJECT START: 1 MAY 2023

PROJECT DURATION: 18 MONTHS

### D6.3 FINAL EXPLOITATION AND DISSEMINATION REPORT

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## **1 Executive Summary**

This deliverable summarizes the communication, dissemination, and exploitation activities conducted during the first 18 months of the 5GEARING project. The 5GEARING project is dedicated to advancing 5G technology transfer within Austria's manufacturing sector. Key focus areas include spectrum management, network deployment, optimized network configurations, and methodologies to meet the unique requirements of industrial applications. At the project's outset, a comprehensive "Dissemination, Exploitation, and Communication Plan" (deliverable D6.1) was released to guide these efforts. Now, after 18 months, this report provides an overview of the project's progress, outcomes, and the impact of its activities on the industry.

## 2 Objectives

### 2.1 Project objectives

The main objectives of this initiative, in line with the principles of project management professionalism, are as follows:

- **Partner engagement and collaboration:** A key objective is to proactively engage projects partners within the ecosystem and foster collaborative relationships. By encouraging synergistic collaboration, the initiative aims to mutually enhance capabilities and drive collective progress.
- **Building strategic relationships:** A fundamental aspect is the establishment and maintenance of robust relationships with relevant business units and industry associations. These strategic relationships serve as conduits for sharing insights, best practices and innovative solutions, ultimately contributing to the overall project goals.
- **Developing stakeholder networks:** A key objective is to maintain and expand a dynamic network of stakeholders. By engaging a wide range of individuals and organisations by industry, academia, society, and standardization bodies, the initiative seeks to create a diverse ecosystem that facilitates the exchange of ideas, expertise and resources.
- **Influence standardisation and regulatory bodies:** A key objective is to have a significant influence on the standardisation and certification processes. This includes actively helping to shape industry standards and ensuring that the resulting certifications reflect the highest levels of quality and compliance.

### 2.2 Deliverable objectives

The objectives of this deliverable are to summarize and report on key activities and achievements in three distinct categories:

- **Communication activities:** describing the efforts and channels by which 5GEARING is reaching out to relevant stakeholders, industry, academia, and society. This is done by informing about project activities and promoting project results.
- **Dissemination activities:** summarizing how the results and knowledge gained during the project is transferred to various communities.

- **Exploitation Activities:** providing a detailed insight into partner engagement on project activities related to WP6. This will involve presenting a detailed account of partner engagement, which will comprehensively describe their contributions, responsibilities and collaborative efforts.

### 3 Outreach Strategy

#### 3.1 Report on 5GEARING Communication Activities in Y1

The communication activities presented in this document aim at promoting the project activities and results achieved withing the 18 months of the project. It is important to emphasise that the 5GEARING project partners have closely worked together to reach the project goals and through various communication activities to reach out to various communities.

##### 3.1.1 Communication Channels

To communicate the project outcomes, several communication channels are being used. The project website provides up-to-date activities and access to the project documentation such as deliverables and scientific publications. Other activities such as conference, workshop and trade fair attendance are disseminated via social media.

##### 3.1.2 Website

The official 5GEARING project website <https://www.5gearing.at> is maintained by SAL, which is the project coordinator.

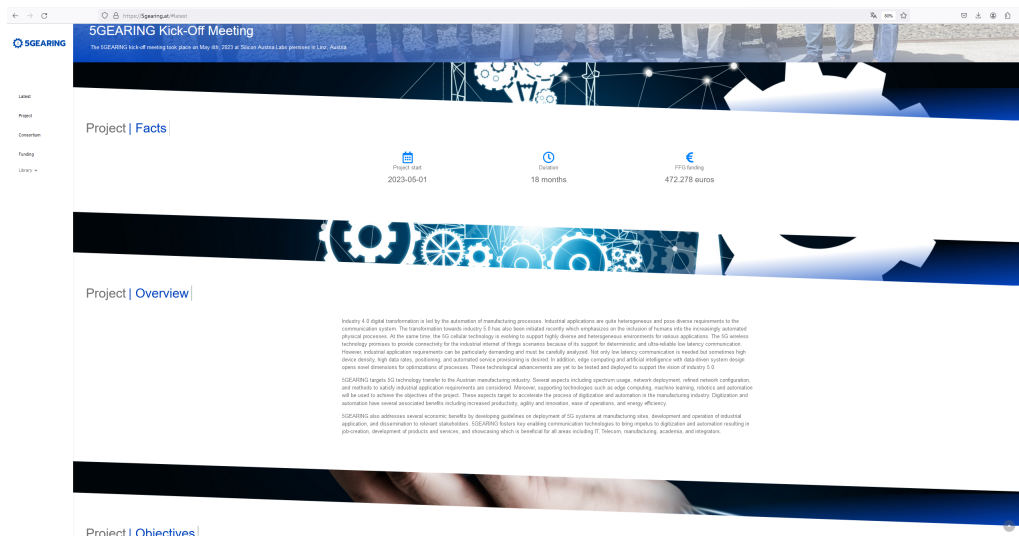


Figure 1: Screen Shot of the 5GEARING web site (2024-06-10).

Performance indicators of <https://www.5gearing.at> show a stream of visitors of 89 unique IP addresses during the Y1 period.

### 3.1.3 Social Media

5GEARING project is active on LinkedIn (<https://www.linkedin.com/company/5gearing/>) with 39 members. As project activities develop, content is published "on demand".

#### Visitor metrics

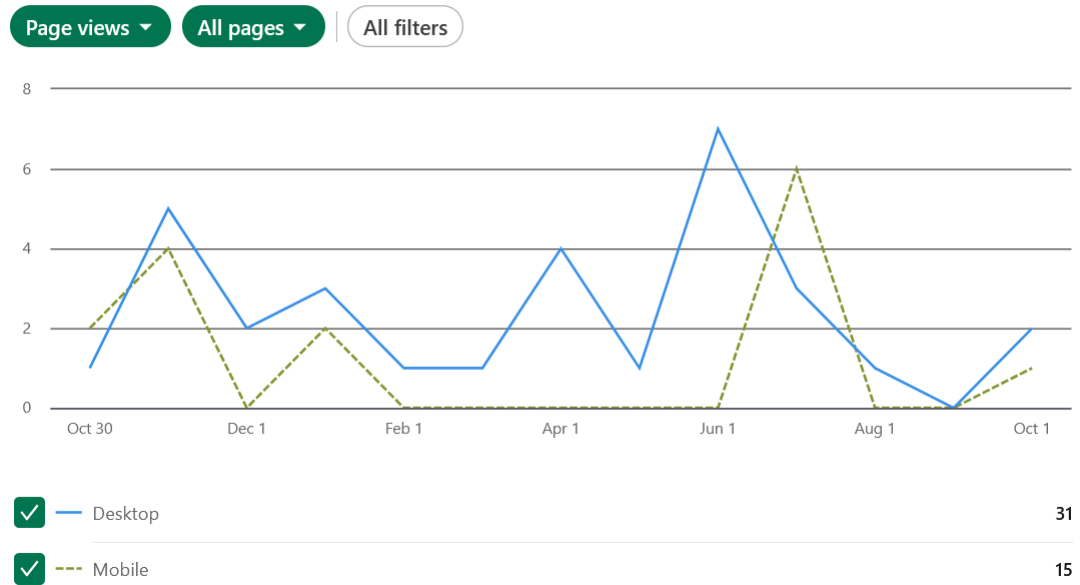


Figure 2: 5GEARING LinkedIn visitor metrics as of 30.10.2024.

## Visitor demographics

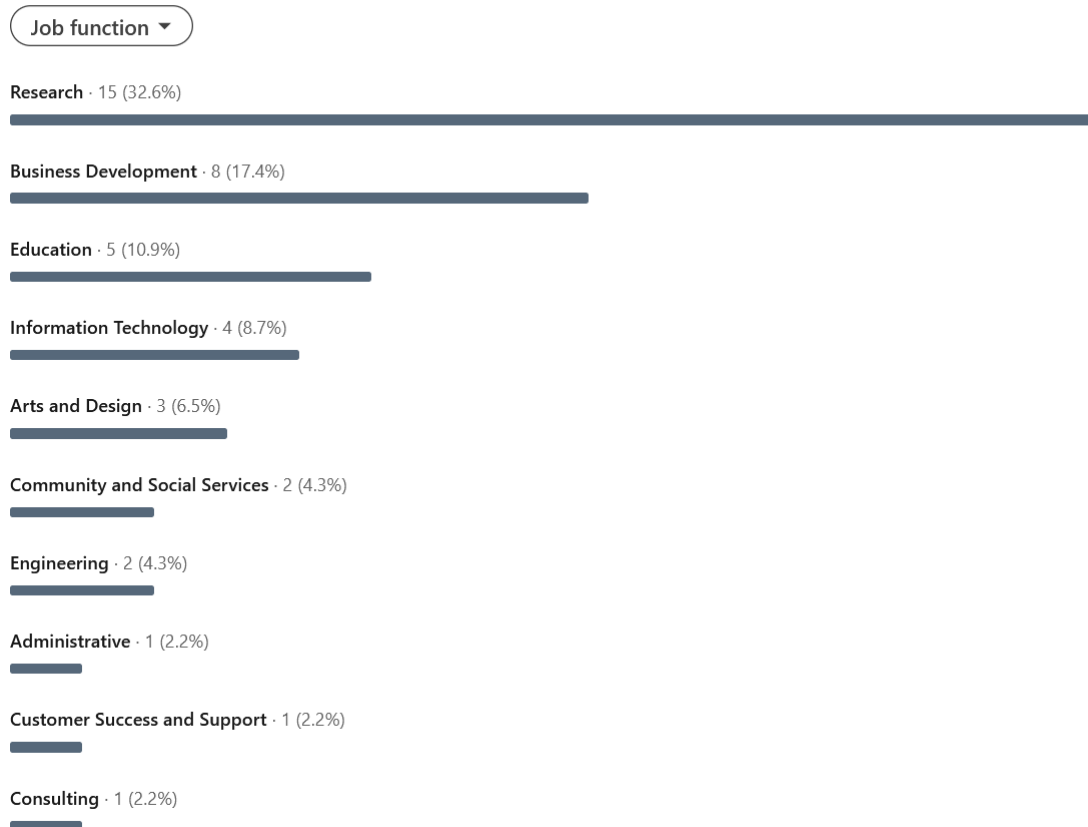


Figure 3: 5GEARING LinkedIn visitor demographics as of 30.10.2024.

### 3.1.4 5GEARING Internal Communication

The collaborative platform used for communication is Microsoft (MS) Teams hosted by SAL. All communication and sharing of data is done through the channel in MS Teams. For the preparation of deliverables, Overleaf is used.

## 3.2 Report on 5GEARING Dissemination Activities

In the following subsections, a summary of dissemination activities during project is presented.

### 3.2.1 Accepted publications

The technical outcomes from 5GEARING project are outlined into four scientific publications, from which three peer-reviewed conference publications and one peer-reviewed journal. The details are presented in Table 1.



Title	Partner	Type	Conference/ Publisher	Peer- reviewed
5G Deployment Models and Configuration Choices for Industrial Cyber-Physical Systems - A State of Art Overview	SAL	Journal paper	IEEE Transactions on Industrial Cyber-Physical Systems	YES
5G Campus Network Factory Floor Measurements with Varying Channel and QoS Flow Priorities	SAL	Technical paper (Conference)	IEEE IECON	YES
Enhanced Modeling of Uplink Configured Grant Transmissions for URLLC	SAL	Technical paper (Conference)	IEEE Globecom	YES
Analyzing Multi-Hop WSN Connectivity using Poisson Point Processes: A Layered Model for Quality of Service Assurance	SAL	Technical paper (Conference)	IEEE PIMRC	YES

Table 1: List of publications in 5GEARING.

### 3.2.2 Workshops, pannels, events and fora

- FFG Gigabit Academy: SAL and Arico technologies participated at the Gigabit academy '23 GigaLab event. The event was organized by FFG where SAL hosted the digital challenge under the title "5G for industrial automation". The 5GEARING project was presented to the participants of the event where the current developments as well as the aims and objectives of the project were presented. Being a challenge host, the Gigabit explorer teams was encouraged to provide solutions to the current communication challenges on 5G for industrial automation to develop community interest under 5GEARING targeted research topics.
- SAL 6G Symposium (November 2023): SAL organized this premier event in Austria focusing on 6G [1]. The symposium brought together academic, in-

dustry, and RTO leaders from various communities, verticals, and expertise along the value chain to discuss their 6G vision and underpinning 6G technologies in areas such as artificial intelligence, metamaterials, intelligent surfaces, integrated sensing, communications, localization, neuromorphic and hardware-efficient architectures. Aside invited talks, the program also featured poster sessions, panel, social dinner, and social event.

- 6G Summit in Dresden (May 2024): SAL contributed on the organization of the IEEE Summit Dresden 2024 [5], an event that unites industry leaders, academic pioneers, and tech enthusiasts providing many insightful talks by global professionals and forward-thinking industry leaders as well as exhibition showcasing with unique demonstrations. SAL organized and chaired Day 1 Exhibition on "Vertical Industry meets ICT Industry on Shopfloor", where several talks were given on the 5G evolution and 5G/6G for industrial automation systems.
- INTERACT 9th MC and 9th Technical Meeting: SAL organized and hosted the 9th Interact Meeting [4] in the scope of the COST Action CA20120, "Intelligence-Enabling Radio Communications for Seamless Inclusive Interactions". The event took place in Linz, and was followed by presentations on the latest research activities in this program.
- SAL Roadshow Linz (November 2024): SAL organized a roadshow in Linz under the motto "Sustainable Innovation: 5G, AI and Regulations" [3]. The roadshow was organized to disseminate the latest research results in the field of electronics and software-based systems (ESBS) and discover exciting cooperation opportunities in the field of mobile communication. During the event, demonstration of the 5GEARING project for advanced robot-to-robot communication and management using 5G communication was presented. Around 50 participants representing 25 industrial organizations attended the roadshow. The attendees highly appreciated showcases of the 5GEARING project and showed interest to collaborate in future projects.

### **3.2.3 White paper**

CANCOM prepared a white paper which gives an overview on the project.

### **3.2.4 Published deliverables**

Table 2 presents a list of deliverables that have been published during the 5GEARING project. As mentioned, all project deliverables are openly available and accessible on the project website.

Number	Title
D1.1	Data management plan
D6.1	Dissemination, exploitation, and communication plan
D1.2	Risks mitigation plan
D2.1	Report on industrial application requirements and communication services
D2.2	Guidelines on 5G campus network deployment, configuration, radio placement, and frequency planning
D4.1	Design guideline on 5G campus network deployment, commissioning, and integration with industrial use cases
D3.1	Define standardized interfaces and technologies that can be used in cyber physical systems and integrated with the 5G system such as a lookup for protocols that can be easily integrated (Camera system, localization system, etc.)
D3.2	Applications and algorithms needed for navigation of robots in industrial setup
D5.1	Report on test procedures and plans
D4.2	Report on 5G system configuration parameters and their effects on communication behavior in relation to the application requirements
D5.2	System validation report
D6.3	Final exploitation and dissemination report
D1.3	Annual project reports

Table 2: List of Deliverables in 5GEARING.

## 4 Exploitation Plan

5GEARING project targets 5G technology transfer to the Austrian manufacturing industry. Several aspects including spectrum usage, network deployment, refined network configuration, and methods to satisfy industrial application requirements are considered. These aspects target to accelerate the process of digitization and automation in the manufacturing industry. Results of 5GEARING will allow participants to explore new market areas and enable the definition of a roadmap for future products and solutions. The exploitation plans both on consortium level as well as individual partner level have been described in D6.1 and remain valid. In this section, contributions by individual partners and further plans on exploitation activities are added.

## **4.1 Report on 5GEARING Standardization and Regulation Activities**

### **4.1.1 Austrian Ministry of Finance**

In Austria the responsibility for Spectrum Management currently lies with the Ministry of Finance. Requirements, future spectrum planning and considerations for Private 5G were discussed in a meeting in March 2024. mmWave frequencies for local private applications will likely be available by end of 2024. As outlined on the web-page of RTR [6], 24.3-24.9 GHz are reserved for private, local applications. The upper part of the spectrum was licensed by A1 Telekom Austria AG (A1), Hutchison Drei Austria GmbH (Drei) and T-Mobile Austria GmbH (Magenta) and There are EU-wide considerations on the use of 3,800-4,200 MHz in the working group CEPT FM60 [2]. A decision on the use of this band could be expected 2025.

### **4.1.2 NIST P3388**

The research and development work being carried out under the 5GEARING project, in particular, the performance analysis of the 5G technology for industrial automation application can be valuable in defining and determining key performance indicators of the system. The IEEE draft standard, P3388, titled **Standard for the Performance Assessment of Industrial Wireless Systems** driven by National Institute of Standards and Technology targets performance measurements of industrial environments. The 5G network performance analysis in indoor scenarios and the outcomes of the planned demonstration of the 5GEARING project will be shared with NIST to consider the results in the P3388 standard.

### **4.1.3 5G-ACIA testbed recognition**

The outcome of the 5GEARING project is a functional demonstration of application in an industrial environment. The demo applications considers the needs and requirements of the industry. Such application developments and its relation to 5G is highly appreciated by 5G-ACIA. SAL intends to apply at 5G-ACIA to recognize the 5G testbed and the applications developed under the 5GEARING project for recognition and accreditation by 5G-ACIA. However, this accreditation process will be initiated towards the end of the project as soon as the demonstration of the 5GEARING project is available.

## **4.2 Individual partner exploitation contributions and plans**

In addition to the overall exploitation strategy, individual partners have been contributing towards exploitation of the project. A summary of individual contribu-

tions and further plans for the remaining time of the project are summarized below.

#### **4.2.1 Silicon Austria Labs**

SAL has contributed to a number of dissemination activities including talks and scientific conferences and one journal publication. Further, SAL has been contributing towards project deliverables, publications, and dissemination of the project at events such as 6G Summit in Dresden [5], SAL Symposium on 6G [1], ESBS-Austria Conference, etc. SAL has initiated a follow up project also with the involvement of other potential research and industrial partners, and as a result a proposal has been submitted to the FFG in September 2024. SAL will continue to exploit the research work carried out under 5GEARING project to attract industry and academic partners and to create awareness on activities performed to maximize the project impact.

#### **4.2.2 Arico Technologies**

Arico Technologies has contributed to various dissemination activities such as project deliverables and to the follow up proposal initiated by SAL and submitted to the FFG in September 2024. It also participated to the FFG Gigabit Academy event together with SAL. Arico Technologies will continue to exploit the results of the 5GEARING project to expand its consultancy and training services by including more details on industrial use cases and campus systems into the training courses. Results of the project will also be used to expand the customer base for consultancy services to industrial users.

#### **4.2.3 MAGNA International**

MAGNA International has contributed towards project dissemination and exploitation activities including project deliverables and definition of industrial application requirements and communication services. MAGNA International will continue to exploit project results to support its transformation/digitization in the area of manufacturing in automotive industry as well as establish new collaborations from a technology perspective with new partners.

#### **4.2.4 Cancom**

Cancom has been part of several dissemination activities including project deliverables and activities on the standardization and regulation for future spectrum planning in Austria for mmWave in private 5G networks. Cancom has also been part of a follow up proposal submitted to FFG in September 2024. Cancom will continue

to exploit 5Gearing results to attract customers and partners from the industrial segment.

#### **4.2.5 Liwest**

Liwest has contributed to project deliverables and has supported on the indoor coverage planning. Liwest will continue to exploit project results emphasizing the advantages of 5G campus solutions over Wifi for this particular use-case.

## **5 Conclusions**

In this document, 5GEARING dissemination and exploitation activities that were implemented during the first year of the project are presented. A detailed description of the available communication channels and materials prepared for dissemination of the project are summarized. The project exploitation activities have been summarised as well as individual partner activities. The individual exploitation plan for the remaining part of the project has been updated and provided in this document as well.

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