1. Entity posing the challenge:

- **Metal Group**

2. Challenge statement

Improving remote assistance services by applying Augmented Reality technologies

3. Context

The automotive industry is made up of complex supply chains, which over time have evolved into a global production network. Although only a limited number of countries and companies lead automotive production, the industry's value chain spans the globe and a large number of companies are involved in the design, development, manufacturing, marketing, sales, repair and maintenance of cars and automotive components. On average, each vehicle contains more than 20,000 parts, which original equipment manufacturers (OEMs) source from thousands of different suppliers. The value chain has increased in recent years, integrating new agents from different fields of knowledge and expertise.

The automotive industry has demonstrated remarkable resilience over the years. It has successfully recovered from the last global financial and economic crisis and continues to make a significant contribution to GDP, world trade, and employment.

Right now, the automotive industry is at a turning point: it faces the digital revolution, environmental challenges, climate goals, societal changes, and increasing globalisation. The main trends driving this transition are the development of new technologies in areas such as automated driving, further digitalisation of manufacturing, reducing the impact of vehicle pollution on the environment and health (a crucial competitive issue which is expected to bring about an increase in global demand for electric vehicles), and societal challenges (such as changes in consumer preferences and an ageing population).

The industry is generally assessing and redefining its position in the value chain, as well as increasing its capacity to add more value in its product portfolio and production processes.

Within this context, the Basque automotive components sector is positioned as one of the most competitive and innovative in the world, characterised by its advanced level of management, high degree of effectiveness, and efficiency. The Basque sector also stands out its ability to integrate, as it brings together the entire value chain within a very small area. It integrates steelmakers, capital goods manufacturers, machine-tool producers, tooling and die makers and machinists, as well as universities, research centres, consultancies, and engineering firms.

At the local level, which is completely interrelated to the international context, SMEs in the sector face different challenges that condition their production activities and business operations. Some of the most significant conditioning factors are the following:

- the **high quality specifications** demanded by the main brands in the sector as well as OEMs;
- the increasingly **demanding functional requirements**, which increase the complexity of the manufacturing processes;
- **product designs which are predetermined by customers** leave little room for manoeuvre for the manufacturing companies;
- the demand for **high cost efficiency** which is closely linked to the improvement of productivity ratios, and is also conditioned by the product designs.
- the importance that SMEs must give to revaluing and optimising their production processes in order to provide value when they **lack their own products**.

In this context, some SMEs of the ACICAE cluster have visualised certain common areas of work in order to improve their competitive position in the market, and this is where the following challenge arises:

4. The Challenge

1. Description of the challenge:

Improving the effectiveness of the automotive sector is conditioned by the digitalisation of work stations within the plants, particularly in terms of the human-machine relationship. This is a differentiating factor for agile decision-making in the production environment. Firstly, talent shortages and generational change mean that human resources must undertake digital training. Secondly, systems/tools must be applied that allow knowledge to be transmitted from the most knowledgeable/experienced people to new employees, and shared among them.

While this is a far-reaching challenge, there are some aspects of daily plant operations that can be improved by applying technologies which would provide operators and technicians with remote assistance. These technologies would help reduce operator error, and consequently costs, while at the same time increasing safety when carrying out the tasks. In this context, automotive SMEs value the application of Augmented Reality technologies:

- In the **machinery or production line design and assembly process** at the customer's site (manufacturing equipment commissioning); support could be provided to the assembly technicians starting up the installation on site from the company's technical office.
- In **repair, maintenance, and error identification** tasks. Offering remote support to the customer, guiding them in certain operations that they are not able to carry out by

themselves. Providing immediacy in emergency situations, stoppages, and other eventualities that may affect production.

Both lines of work are focused on the creation of new value-added services that increase customer loyalty. However, in spite of the advantages of applying these technologies, they face the challenge of being "**difficult to deploy**" or start-up, given that it is still difficult to "enrich the information in the devices". Consequently, **human efforts must be invested to prepare the information to be deployed, as it is not yet standardised for the information to be accessible to all companies.** In addition, work must be done to ensure the technology is used to develop systems simple enough to be used by any employee.

2. Main impacts

Augmented reality technologies enable collaborative work where the field operator is never alone and can always be connected to their operations centre. Technicians can see and talk to the operator in the field to verbally explain how they can solve the problem; they can also send PDF files, videos, or images to help understanding and reduce the time needed to complete the task. They allow the company's digitised information to be transferred to the worker at the right time and in the right way, making it easier for machine users to use the machinery.

The **main benefits** expected from the application of these technologies are: faster problem solving, accelerated knowledge transfer, reduced costs (e.g. travel, human-hours, etc.), improved processes and operations through dynamic information exchange and increased safety.

3. Main questions to be solved

- Would it be possible to develop a solution that provides remote assistance for maintenance or start-up tasks at the customer's plant via WiFi, 4G, or 5G?
- Would it be possible to offer these remote services at the customer's site, while ensuring the privacy of the connections and complying with customer security protocols?
- Would it be possible to design an augmented reality platform that allows different solutions and developments to be integrated?
- Would it be possible to incorporate a document management system into this platform which would provide access to procedures, maintenance guidelines, operation guides, etc.? The documents would be accessible at points on the manufacturing line associated with the corresponding instructions and/or guidelines and/or procedures. Access could be via a QR code, barcode, tag, Bluetooth, etc. (in general any means that does not interfere with any device installed in the plant).

4. Technical characteristics of the challenge

The technological solutions expected to address the above challenges are:

- Augmented Reality
- Other remote support technologies.