AUGMENTED, MIXED AND VIRTUAL REALITY

Where real and virtual worlds meet.

ENGINEERING

WHAT ARE WE DISCUSSING?

AUTHORS

Francesco Benvenuto

Product Marketing Manager, SPACE1

Francesco grew up in Friuli Venezia Giulia, Italy, and graduated in Business Economics. He worked in London in digital marketing and then moved to New York City where he co-founded a digital startup. He currently resides in Italy and works for OverIT, the Engineering Group's company specialized in Field Service Management. He is passionate about technology and innovation and leads the Product Marketing for SPACE1, the OverIT's Augmented, Mixed and Virtual Reality solution.

francesco.benvenuto@overit.it
benvenutofrancesco

Andrea Bardini

Product Marketing, OverIT

With over 6 years' experience in the IT Industry, Andrea has worked in Marketing roles for OverIT in Italy. His experience both in Business Development and Marketing has given Andrea a strong grounding in uncovering, defining and positioning market value. Andrea is currently focused on enhancing and developing OverIT's Portfolio and its brand positioning. He's also responsible for positioning and certificating OverIT and its products with research-consulting firms such as Gartner and IDC specialized in Field Service Management. He is passionate about technology and innovation and leads the Product Marketing for SPACE1, the OverIT's Augmented, Mixed and Virtual Reality solution.

andrea.bardini@overit.it
andrea-bardini-3a9909a3

Saul Mosanghini

Product Manager, SPACE1

With over 20 years of IT experience as an Analyst, Project Manager and Product Manager, Saul has always been involved in implementing technologically innovative solutions by analyzing market demands in the Industry sector, guiding development teams and directing the creation of software solutions from the prototype phase to the mature product stage.

In the first part of his career he focused on optimization solutions based on heuristic algorithms applied to logistics, production and manufacturing. Since 2014 he has turned his interest to AR, MR and VR technologies. From 2017 he is the manager in OverIT of the SPACE1 solution.

saul.mosanghini@overit.it
saulmosanghini

Alberto Battistutti

Marketing Communications Manager, OverIT

Alberto is an experienced marketing communications professional born and raised in the northeast of Italy. In addition to a degree in mass communication, and an MBA in marketing management, he has a strong background in journalism and screenwriting, and a broad set of competences in the multimedia field. At OverIT Alberto is the Project leadership for all communication activities.

alberto.battistutti@overit.it
abattistutti

A FEW WORDS

In the era of Digital Transformation, Augmented, Mixed and Virtual Reality are the latest and most promising enabling technologies that have the potential to reshape operations in many industries and within a variety of fields. Indeed, the implementation of these game-changing solutions enables companies to rethink their business processes and procedures.

Recent researches from Gartner indicate AR, MR and VR as the technologies that will become key components in the Digital Transformation strategies of nearly all enterprises. According to the advisory firm, by 2020, 30% of large enterprises will adopt AR applications on mobile devices as part of their Digital Transformation strategy while 25% of large businesses in mature markets will pilot and deploy mixed reality (MR) solutions, up from 1% in 2017. These assumptions highlight the magnitude and impact that AR, MR and VR in the near future. Moreover, it can be noticed that these technologies can and will be applied in many industries, supporting and reshaping many different activities.

The aim of this paper is to present Engineering's AR-MR-VR Value Proposition, services and proprietary solution -SPACE1- and a future outlook vision.
SPACE1 is a cutting-edge Augmented, Mixed and Virtual Reality solution resulting from the knowledge acquired throughout the long-term Field Service experience. Moreover, these chapters will help you in discovering SPACE1 functionalities, its business applications and the benefits it provides to any business.

SPACE1 is an all-in-one solution, accessible to different types of companies, regardless of their size or trade volume. It integrates all the latest technologies and services, moving towards innovation and increasingly covering aspects of the Industry 4.0 every day. The experience gained and the multitude of projects carried out over the recent years make SPACE1 the perfect solution for supporting the next generation technicians during the on-field execution, broadening their capabilities, thus helping them complete their repair and service tasks more quickly and efficiently.

Thanks to its flexible configuration, it can be used in different application areas such as Maintenance, Collaboration and Training & Learning. Furthermore, applying AR, MR and VR to Field Service Management (FSM) helps raising safety standards, improves overall efficiency and the quality of the tasks performed, while reducing the margin of error and the time needed to complete the work at hand.

1

WHAT ARE AR-MR-VR?

In a world undergoing continuous Digital Transformation, technology appears a convenient and useful tool when applied in any business area. Technology is advancing at a faster pace than ever, enabling the development of new products and services.

Few emerging technologies representatives of the technology era appear to be Augmented, Mixed and Virtual Reality, enabling to overcome the realities and limitations of the physical world. They change the way people interact and perceive the world, bringing user experience to a whole new level. When applied to business, they reshape industrial processes, improve overall efficiency by increasing the perception of the surrounding environment, and enhance customer experience and satisfaction.

2

HOW DO THEY WORK?

AUGMENTED, MIXED AND VIRTUAL REALITY

In brief, AR-MR-VR applications combine the following components:

- Hardware devices that work as displays (e.g. Head-mounted displays, smartphone screen, eyeglass) and input sources (e.g. sensors, camera, gyroscope, etc.)
- Software programs that transform data into 2D or 3D images
- Remote Web & Cloud servers that store related data & information.

The main approaches that trigger AR-MR-VR applications are:

- Marker-based, when triggered by a specific symbol (e.g. QR code)
- Location-based, when triggered to a real scene (e.g. machine).

Wearables are another reason for the increased interest in such technologies together with the software tools provided by major players. If properly designed and targeted, both hardware and software can provide enterprises with a chance to reshape existing ways of handling their processes.

Software development frameworks, such as ARKit and ARCore – introduced by Apple and Google respectively – enable the integration between the virtual content and the real world through the device's camera. These technologies provide the user with capabilities such as:

- **Motion tracking**, to detect the movement of assets and transfer sensed data to an application, in order for the device to understand its position around the world
- **Environmental understanding**, to identify flat horizontal surfaces (e.g. the ground or a table), figure out both their size and location and use such data to place virtual models on the desired surface
- **Light estimation**, to assess the environment and light virtual models under the same conditions
- **Image recognition**, to identify assets, places, people, texts and actions in images
- **Asset recognition**, to detect specific assets.

At present, these technologies are capable of effectively bringing value to the businesses adopting them. Many advantages come along with their usage in terms of reduced times for fixing, faster maintenance procedures, improved productivity and efficiency in any kind of process, increased workforce safety. These and other benefits will be further outlined in the present document.

With supporting technology spreading fast and the cost of the devices falling – as was already the case for handheld devices – AR, MR and VR are expected to become "can't-live-without tech".

3

WHAT DO AR-MR-VR DO?

AUGMENTED, MIXED AND VIRTUAL REALITY

1

Augmented Reality (AR) is where the digital meets the physical world. AR can be thought as an expansion of the user's environment, which is enriched in real time with superimposed digital models and information, such as texts, graphics and multimedia content. The aim of such technology is indeed to "augment" or, in other words, to enhance the user's physical world with contextual, significant and relevant information.

2

Mixed Reality (MR) integrates digital models into the physical world. Unlike AR, it enables users to interact with the artificial models displayed within their field of vision, thus making them aware of the environment around them.

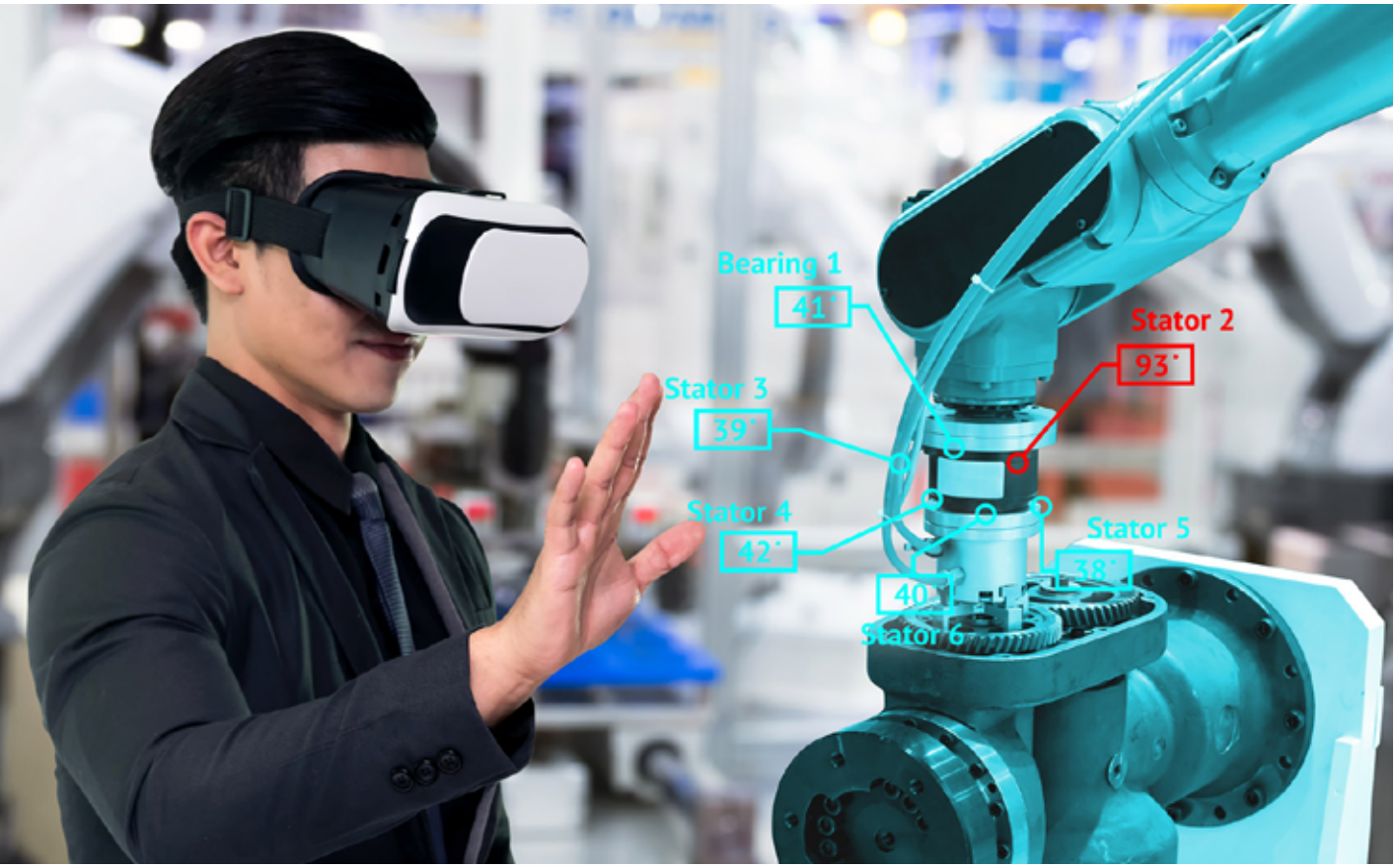
3

Virtual Reality (VR) can change the way the world is perceived since it immerses users into an artificial, imagined, computer-generated environment. They are separated from the real world and transported to a virtual one, where they are able to interact with objects and places perceived with their five senses.

67.9929

4

WHY ARE THEY IMPORTANT FOR YOUR ORGANIZATION?



AR, MR and VR present plenty of excellent business opportunities. Despite the initial expectations of the public, that such technologies could have revolutionized entertainment and gaming only, it is now clear that their application can be extended to business processes of all kinds, from sales and marketing activities through Field Service, Remote Support, Training & Learning, up to Manufacturing.

To improve, in any field of life, the quality of work and lifestyle, by delivering:

- facilitated access to skills/assets
- risk mitigation for inappropriate handling
- augment business operations
- improved content personalization.

The benefits of adopting these technologies are huge. First, they improve health and safety standards; then, they allow customers to acquire the know-how and expertise gained by our teams in several projects carried out in collaboration with major players in many industries over the years.

When applied to business, these technologies allow to reshape industry processes, reduce costs, enhance both customer experience and satisfaction and improve overall efficiency by increasing the perception of the surrounding environment.

> At COBO we are constantly evaluating industry relevant innovations in search of improved customer satisfaction through operational high performance, quality and training. Our technicians today thanks to SPACE1 and Augmented Reality can solve issues faster and work safely thanks to hands-free real-time information.

Enrico Linetti
CEO at COBO Group

5

WHAT IS OUR APPROACH AND SOLUTION?

AUGMENTED, MIXED AND VIRTUAL REALITY

Starting from our deep knowledge of technologies and of our Customers' business processes, we develop new AR/MR/VR experiences and applications to satisfy specific business needs, allowing customers to fully exploit the advantages of Augmented, Mixed and Virtual Reality.

SPACE 1

We design, plan and develop solutions for maintenance activities of production facilities and supporting services, for Virtual Collaboration and knowledge sharing, real-time remote assistance and training, virtual instructions and integrated cartographic components.

SPACE1 is the all-in-one solution that leverages Augmented, Mixed and Virtual Reality to support modern technicians during the on-field execution, broadening their capabilities thus to help them complete their repair and service tasks more quickly and efficiently.

Our team is committed in delivering a product which is accessible to different types of companies, regardless of their size or business volume. The experience gained by our experts in the multitude of projects carried out over the recent years resulted into one single product, SPACE1. Adopting a product-oriented approach means offering the market a reliable and consolidated solution, which is structured, configurable and enriched by features developed based on the experience acquired, tested on field and further enhanced also thanks to the users' feedback.

SPACE1 is quick and easy to implement thanks to the wide range of parameterizations and connectors for the integration with any enterprise system. All the data can be stored on-cloud and on-premises in order to be compliant with different security policies. It can be used both online and offline, thus keeping technicians productive even outside network range. Furthermore, because it was developed to ensure high flexibility it is both cross-platform and multidevice.

Being a multiplatform product means that it is designed for and it is compatible with multiple operating systems, therefore, enabling users to choose among a wide range of hardware devices. Equally, even the device choice can be made based on the company's preference, since SPACE1 not only is multiplatform, but also multidevice. It can indeed be run on handheld devices (tablets and smartphones), Augmented, Mixed and Virtual Reality headsets.

6

WHERE DO WE APPLY THEM?

We implement AR-MR-VR applications whenever there is a need to act on complex plants and machinery and when reality cannot be replicated easily, or only at a high cost, across different market sectors: Digital Industry, Augmented City, Smart Energy & Utility, Smart Transportation.

For instance:

- to support Field Service and maintenance processes
- for training activities
- for the fruition architectural, cultural and museum assets
- for virtual gaming
- to support and assist product selling activities.

Extended Collaboration, Maintenance and Training are the application areas in which Space1 offers real added value.

EXTENDED COLLABORATION

SPACE1 expands the concept of collaboration between users, introducing innovative ways of working. Among the features available, SPACE1 allows real-time content sharing and manipulation with multiple users, thanks to an advanced toolbox for annotations, multimedia and virtual content sharing and the tracking of the tasks performed.

SPACE1 comes in handy for Field Service Management which includes those activities aimed at supporting the workforce operating on field (at customer's premises, on assets or on technical networks) or within facilities and production plants. Applying AR, MR and VR to Field Service Management helps raising safety standards, improves overall efficiency and the quality of the tasks performed while reducing the margin of error and the time needed to complete the work at hand.

EXTENDED MAINTENANCE

SPACE1 allows to improve quality assurance and enables field technicians to complete tasks quicker. Complex assembly and maintenance tasks in industrial environments are excellent domains for Augmented Reality (AR) applications. The need for good training and the access to large amounts of documentation are conditions making the use of AR techniques most promising. In industrial environments, maintenance processes are very important to guarantee quality and often quite cumbersome. In the case of complex mechanical equipment, such processes usually demand access to documentation such as technical manuals. This is especially important where & when the procedures are performed infrequently.

Maintenance activities are often closely related to the location; therefore, these activities are often performed on assets that are in a specific Geographical location. SPACE1 provides union between Geographical Information System (GIS) and virtual data, thus allowing users to visualize spatial data using coordinates. SPACE1 enables the visualization of networks, assets and technical data in Augmented Reality, while the contents are dynamically represented with tracking and positioning features. The users can benefit from realistic 3D visualization of geospatial data, including hidden assets, the impact settling before creating new plants and networks and the reduction of time needed to identify assets on field.

EXTENDED TRAINING

Another area where documentation and guidance are essential is the training of workers on new maintenance or complex assembly tasks. As the complexity of the assembly or maintenance task increases, training becomes the significant factor in respect of both time and money. SPACE1 includes dedicated functionalities for providing Mixed and Virtual Reality Training (also from remote) on complex plants and machinery. Such functionalities are particularly useful in those situations where it would be too difficult or expensive to recreate a real training room.

Extended Training can be used on multiple platforms, from tablets to the immersive Head Mounted Display (HMD). The latter implies a computer-generated environment which allows the full immersion of users in a virtual world. Even though immersive experience is more engaging, it is often less comfortable due to the complexity of content creation and the need to rely on a development made outside the company. In SPACE1 this point is overcome since the platform allows the content creation for all the technologies - AR, MR and VR.

SPACE1 client component consists in using an application that allows to practise a training or a simulation, while the back-end application allows real-time adjustments. This means that it is possible to customize the environment, both Augmented, Mixed and Virtual, according to the user's needs.

Extended Training can help organizations achieve faster growth by arming employees with hands-on experience instead of just theory, that always needs to be refined through trials and errors on the field. In addition, it is possible to simulate real-life situations that are just as good as reality, without risking training-related injuries.

Alongside with the qualitative benefits in terms of less time spent planning and traveling, greater employee retention, better supervision and remote cross-training also bring quantitative advantages. On the other hand, increased supervision impacts quality of service and customer satisfaction.

7

HOW WILL AR-MR-VR EVOLVE IN THE FUTURE?

5G mobile network technology will accelerate the adoption of AR and VR in stores, driving sector revenues by improving customer engagement and brands' product management cycle.

Technological advancements in motion tracking sensor and display technology will drive AR-MR-VR applications.

The evolution of dedicated authoring tools will facilitate content creation for Virtual Training and its widespread adoption.

ENGINEERING

Engineering is one of the main players in the field of Digital Transformation of public and private companies and organizations, offering an innovative range of platforms for the main market segments.

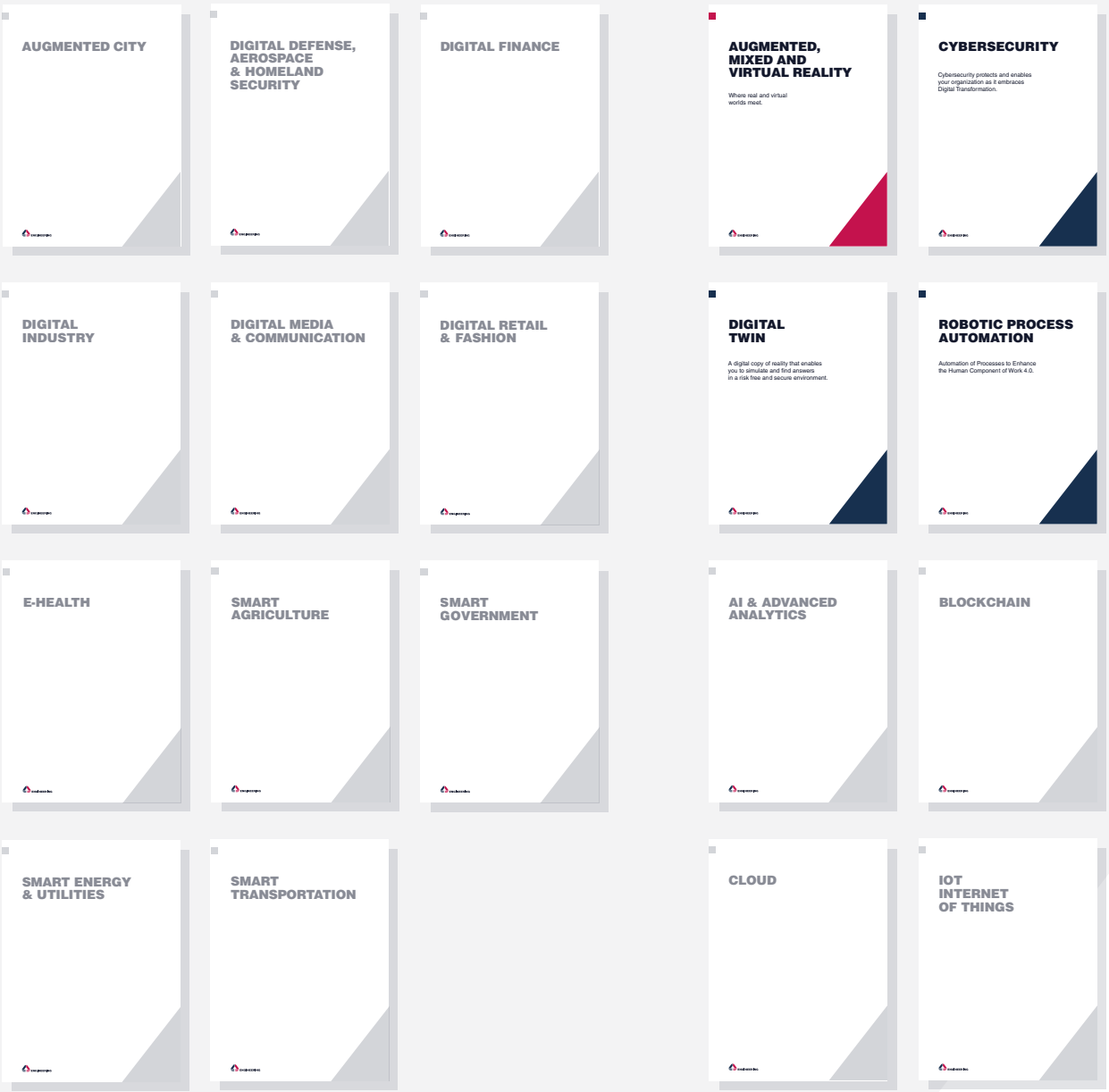
With around 11,000 professionals in 65 locations (Italy, Belgium, Germany, Norway, Republic of Serbia, Spain, Sweden, Switzerland, Argentina, Brazil and the USA), the Engineering Group designs, develops and manages innovative solutions for the business areas where digitalization is having the biggest impact, including Digital Finance, Smart Government & E-Health, Augmented City, Digital Industry, Smart Energy & Utilities, Digital Telco & Multimedia.

Through its activities, the Group contributes to modernizing the world in which we live and work, combining specialist competences in next-generation technologies, technological infrastructures organized in a single hybrid multicloud and the capability to interpret new business models.

With significant investments in R&D, Engineering plays a leading role in research, by coordinating national and international projects thanks to its team of 420 researchers and data scientists and a network of academic partners and universities throughout Europe. One of the group's key strategic assets is its employees' know-how, to whose training it has dedicated a multidisciplinary School which has provided more than 21,000 days of training during the last year.

www.eng.it/en

Our point of view on



Coming Soon

ENGINEERING

www.eng.it/en

@EngineeringSpa

Engineering Ingegneria Informatica Spa