

Digital continuity applied to space sector

Space application domain illustrated - Manufacturing, Assembly, Integration and Testing

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Immersive Technologies domain tracks the suite of technologies that complement human senses to interact with the virtual world and augment interaction with the real world. Collectively, this term is known in the industry as Augmented Reality, Virtual Reality and Mixed Reality and abbreviated to AR/VR/MR. Immersive Technologies are likely to present a completely new way to engage and expand the abilities of workers, leveraged by tangible gains, in many sectors: consumer industry, retail, discrete manufacturing, transportation, healthcare, building or military. AR/MR are being used to enable field staff to do their jobs more efficiently in production, control operations and maintenance activities; while VR is used to enhance training, prototyping, simulation, virtual visit and sales enablement. The Capgemini offer on this domain combines a portfolio of services aiming to cover a structured end-to-end approach leveraged by a comprehensive ecosystem of partners, and some exclusives own IPs accelerating the deployment of Immersive experiences for our clients.

Industrial actors will benefit from the growing user adoption of Immersive Technologies, generating operational gains across production cycle for industries, sales enablement, client and user satisfaction, leading reputation and growth. This is expected to be driven by enhanced Immersive experiences, enabled by the combination of software and hardware advances. The possibilities of AR/VR/MR are endless, especially when combined with the ever-evolving wireless technology or other emerging trends such as AI, IoT or 5G, enabling new operational uses. Consumers need to be supported on the know-how, identification of valuable use and business-cases. They need to focus on the user experience, change management and the redesign of their operational process to leverage the full power of these technologies at scale. As a result, industrial actors require partnering with experienced integrators such as Capgemini, proving a strong expertise, an end-to-end coverage, platforming and upscaling capabilities.

- **Next challenges of Immersive Technologies:** Vendors are spending a lot in R&D to achieve mainstream adoption by both Industry and Consumers. The last big announcements give us a glimpse of great enhancements in the near future, including:
 - ❖ **Immersive and Artificial Intelligence:** XR combined with AI is a powerful capability to connect physical and digital spaces. Image processing, computer vision, deep & machine learning integrated in AR/MR technologies provide a lot of concrete solutions. It will ease **the physical environment recognition** providing accurate virtual elements location, helpful for workers and consumers in their immersive experience.
 - ❖ **Immersive, 5G and Cloud computing:** the wide scale deployment of 5G networks and its combination with the cloud will contribute to a **seamless experience for users**. Reliability, convenience and low latency of 5G are advantages AR platforms will most likely exploit. It allows to take the major benefit of Cloud computing, for real-time interactions on the field, **promising the use of ultra-light and basic AR glasses** with less computing capability replacing the bulky existing ones making prolonged usage unlikely. Cloud AR computing technology will make sense with 5G to enable fast environment recognition, delivering rich immersive content everywhere.
 - ❖ **Immersive content authoring and up-scaling perspectives:** for the manufacturing sector, it's essential that it's a **quick, easy process to create the immersive content** workers will use on the field. Fast **live 3D work instructions creation on the field** supported by Cloud computing is a trend major vendors are following. For instance in production, it is less time consuming to design Immersive content than using traditional method like the Mylar or laser projector than can take weeks to set up. Considering AR/VR/MR deployment into a global **3D Digital Continuity** approach is also key to minimize the effort required by the authoring of immersive content, thanks to the reuse of engineering data. In an IT/OT convergence perspective that plays a strategic role to enable up-scaling of initiatives, we also have collectively to ensure the right governance model between IT and Métiers teams.

As a first part of our talk, Capgemini will present its motivated and recognized view of the latest trends and challenges in Immersive Technologies. Then CNES will illustrate a concrete project of digital transformation performed with Cap Gemini of activities related to Manufacturing Assembly Integration and Testing domain. This example will enlight the use of 3D mockup linked with Augmented Reality in operational environment for the AIT of scientific payloads.