IMMERSIVE TECHNOLOGIES IN BUSINESS OPERATIONS AT ATG EUROPE

2022

ATG europe

accelerating innovation

TABLE OF CONTENTS

INTRODUCTION

High tech sectors are typically characterised by high levels of technical complexity and a geographical distributed supply chain necessary to execute large development programmes. Key stakeholders often include research Institutions, regulatory authorities and customers that are also typically distributed across multiple sites and geographies. All these stakeholders require increasing means and more efficient ways of cooperating amongst themselves and with the supply chain.

Managing this increasing complexity well is becoming a significant challenge.

“Today, the need for risk and cost reduction in high-tech industries is becoming more and more urgent.

Optimisation of processes through the implementation of digital technologies is key in adressing this.”

OBSERVED TRENDS

Even though complexity in large development programs in itself is not new, recent trends and events have made the necessity to lower risks (and cost) associated with it much more apparent and urgent.

One major trend is the increasing pressure on governmental development budgets on the one hand and the need to foster industrial and technological competitiveness on a global scale on the other. Reconciling these ambitions and trends implies some fundamental changes to the ways in which business is carried-out. It means finding efficiency improvements and cost reductions without compromising on quality and risk management. This is a challenge that can only now start to be tackled through process re-engineering and technological advancements made possible by and through digitalization.

Specifically within the space sector, there is a slow but accelerating movement towards further commercialization of the domain. In this new paradigm we observe a gradual departure from the traditional, centrally controlled space programs model. Most importantly this change towards a market-driven approach, is being more heavily supported by the capital markets, which expect to see growing rates of return from their investments in the space sector. This clearly requires a new mindset of series production, automation, and less costly and generally leaner processes and businesses, which rely heavily on digitalization of operations and environments.

The commercial SpaceTech sector is extremely fast-growing. The market could triple in the next few decades*.

*According to SpaceTech Analytics 2021.

The second major trend was initiated, or at least made visible, by the COVID pandemic. Because of this global crisis an immediate and urgent need for remote collaboration and data sharing was created. Even though to some extent existing technologies have been able to alleviate this need it is questionable if these solutions are optimal and sustainable for the longer term. It is equally questionable if, when the pandemic has passed, business will go back to their old collaboration ways as many stakeholders (employees, companies and governments) see clear benefits, both economic and environmental in the new remote collaboration norms established during COVID.

Luckily we enter a time in which new possibilities to tackle the above-mentioned challenges arise in unprecedented forms. New technologies (or at least new implementations of technologies) such as virtual and augmented reality offer the potential to disrupt our existing ways of working, collaborating, knowledge sharing and product development overall. Major tech companies are focusing more and more on these, each from their own perspective, but with the common denominator of trying to leverage on the added value of immersive interfaces when interacting with three (or more) dimensional datasets. Considering the large customer bases these companies already have for their regular product base, these novel initiatives might in fact be the "acceptance game-changer" that these immersive technologies have been looking for.

Industrial companies are projected to invest over

$7 BILLION

in Augmented reality by 2024*.

*According to PTC 2022.

BEYOND THE METAVERSE

**The world we live in is evolving rapidly.
When Steven Spielberg released Ready Player One only four years ago, introducing the term Metaverse to a wider audience, not many people could have thought that the sci-fi world he showed us was much closer to reality than believed.**

Certainly, Immersive Reality as a technology was already used in specific cases, both in consumer and business environments, but the pace at which developments are currently taken place is at another level. As some of the biggest tech companies on the planet become fully invested into making (their version of) the metaverse a reality as an immersive platform, the perspective of linking to large groups of customers (consumers mostly currently) incentivizes content developers to use these platforms for the experiences and products they develop.

Today we are seeing most immersive platform development initiatives aimed at social interaction between consumers. For companies like Meta where larger user communities means more advertisement income that seems logical. However, it leaves a large potential for the business community unused. After all, in business processes focus is often much more on data than on social interaction. This is of course especially true for engineering and development environments. The use of an immersive platform for this data interaction can bring clear added value to the user. It has the potential to significantly increase insights and optimize key processes, such as design, communication and reviewing but also training, guiding and testing.

Microsoft, judging from their Mesh platform initiative, seems to appreciate this aspect and is developing in this direction. As a major provider of business operations software as well as of the business oriented high end Augmented Reality Hololens device this makes perfect sense. Adding Virtual Reality and "standard" web-based access into the equation makes for a potentially very powerful immersive multi-platform where the visualization of and the interaction with the data is at the core.

The existence of a business-oriented immersive platform, a corporate metaverse if you will, provides companies and users a central data hub accessible through various interfaces, immersive or not. Which interface is used is up to the user and will be driven by the application of the data itself and the needs of the user in using it. Once selected, the key to the most efficient use of such interface lies in the design of the visual representations of and interactions with the data to ensure the user has to spend as little time thinking about how to use the software.

AR and VR are not new, but full integration into business processes is not yet achieved. Below cases show how such an integration could improve core activities in organizations.

Achieving automation of Assembly and integration

Industrial companies integrating complex systems with components and subsystems from various supplier in different locations are starting to see clear benefits in implementing Augmented Reality Head Mounted Displays into their Assembly and Integration processes. This allows them to perform their activities hands-free, increasing their efficiency and quality levels, while lowering turn-around time and risks of failures.

In the ideal case the headset directly links to the company's Product Data Management Tool (PDM), creating a direct correlation between the design state of an item (including all relevant data) and the processes and procedures to be followed by the operator typical for that phase of the project.

In addition, using the same models from the PDM as well as the procedural steps provided in Augmented Reality, new operators can be trained in virtual environments to further improve quality and efficiency.

Immersive technologies support remote reviews and validations

Large governmental Agencies in institutional environments (such as aerospace or defence) often play the role of end-customer in development programs. They are tasked with reviewing and authorization of missions and all the developments related to it.

Where in the past this process of reviewing and authorization was build around paper documents and physical meetings, today a clear trend can be observed to move towards a digital model based approach. Not only does such an approach provide the Agency with an unambiguous representation of the development status (single source of truth), it also immediately provides digital content that can be linked to other processes.

Adding a Virtual Reality interface to the data would allow for remote review collocation as well as increased insights into three dimensional data, whereas adding Augmented Reality to the equation could add value to test support activities.

Different data requires different interfaces: there is no "one-size-fits-all"

– Michiel Vullings, VirtualLab Business Lead

DEPLOYING YOUR AR / VR

By now, two core messages should be stuck in your brain:
One, immersive technologies can greatly improve your business processes and Two, there is no single optimal solution that fits all your processes. So, how to go about implementation then? The following steps can help you on your way.

Analysis

First it is important to identify and detail out the process you are seeking to optimize. What's its objective, what data is used, and in what format? How is the process performed and by what kind of user? Where do you see improvements and why?

Asking these kind of questions should present you with a good overview of the activities and users that are involved.

Map

Once the process is analysed, it can be devided into smaller pieces and described through different use cases and associated user requirements.

Having these requirements formulated provides a framework for the technological functionality that is needed and the actual technology that is a best fit. By mapping the different technologies onto the use cases a first architectural design of the overall solution is developed.

Develop and implement

After the first design, all technologies should be integrated together. This can be as straight forward as the implementation of different functionalities in a single virtual or augmented reality experience or as complex as the build up of a multi-platform solution combining different interfaces to access a single data source.

Whatever it is, there is an important aspect that should never be overlooked: the User Interface that drives the usability and efficiency of any tool.

Contact experts

It is very likely that you recognise some of the issues in this paper also in your organisation. It is equally likely that you are not an expert in immersive technologies. This can be a challenge, not only in the actual solution design and development phases but even more so in the definition of the requirements. To fully appreciate what you are asking for, you need to understand the implications of your requests.

This is where the experts come in. Not only to implement what you tell them to implement, but to challenge your request and if needed provide a better alternative.

PROJECT INVOLVEMENTS

01 — System Engineering

Model Based System Engineering (MBSE) is a discipline in which the design and development of a product or a system is fully represented by digital models. Typically these digital models can be of many different types and formats, from workflow models to functional models to geometrical models and beyond. This diversity of models implies that for MSBE as a process it is not likely that there is a single type of interface that is a best fit for all. Even with use cases within the MBSE framework different interfaces may be applicable depending on the models and the data associated with them. ATG Europe, together with partners, is currently investigating this challenge, finding solutions that are user-centric regardless of the underlying technologies.

02 — Cable routing

Cabling, cable routing and harnessing are important aspects of any complex system design process. Cable design (and definitely implementation of the routing) is done only towards the end of the development process, which is typically when there is little margin left in the mass and space allocation budget of the system. Often this leads to unforeseen complications and even to redesign of parts of the system. To improve the cabling process overall, ATG Europe is developing a tool that, through the use of Virtual Reality, allows for design of the cable routing already in earlier design phases. This lowers risk of conflicts later and additionally allows technicians to train themselves prior to the actual activity. The resulting designs can furthermore be used for in-operations Augmented Reality support during the actual installation.

YOUR NEXT STEP

The rate at which immersive technologies are maturing is accelerating and, judging from the current developments in the consumer market, their full adoption in the business environment seems only a matter of time.

As these technologies offer functionalities beyond the state-of-the-art of standard interfaces, they have the potential to significantly increase efficiency and lower risk and cost, if implemented well.

That is why it is important for organisations to prepare for and embrace these new ways of working. Identifying the possibilities out there and how they can work for you, is a first step towards that.

MORE ABOUT IMMERSIVE TECHNOLOGIES

For more on immersive platforms and technologies, and how they add value Forrester, PWC, Microsoft and Oberlo.

MORE ABOUT UI/ UX

Additionally, on the value of good UI/UX see article Don't Make Me Think – Key Learning Points for UX Design for the Web

DON'T BE LEFT BEHIND

Start your Immersive Reality journey now and contact us.

ABOUT ATG EUROPE

ATG Europe is a leading provider of specialised engineering, scientific and technical services to the aerospace and high-tech sectors. With offices in 4 countries across the continent ATG stays close to customers, right at the heart of the industries it works in.

With a portfolio of services and products ATG aims to support organisations, accelerating their innovation process, and making sure they stay at the forefront of technology. This is apparent throughout the whole company, but moreover so in the VirtualLab, ATG's dedicated business unit specialised in immersive technology service provision.

For more information see:
www.atg-europe.com

Contact

ATG Europe

Huygensstraat 34
2201 DK Noordwijk
The Netherlands

+31 (0)71 579 5500
michiel.vullings@atg-europe.com