



CUSTOMER CASE STUDY

The evolution of a digital twin: KBR develops a single, connected environment to help bp achieve its remote-operations vision

KBR - www.kbr.com/en
Industry - EPC

Goals

- Develop a digital twin in the engineering phase of the ACE project and mature it into the operations and maintenance phase
- Ensure a seamless handover

Challenges

- Needed the tools to establish a single point of access to all critical project data, accessible anywhere

Solutions

- AVEVA™ Asset Information Management
- AVEVA™ E3D Design
- AVEVA™ Information Standards Manager

- AVEVA™ Engineering
- AVEVA™ Connect
- AVEVA™ XR
- AVEVA™ Point Cloud Manager
- AVEVA™ Unified Operations Center

Results

- Efficiency gains from rapid access to connected info
- Increased automation of workflows
- Enhanced collaboration between disciplines and third parties
- Improved reporting and analytics
- Faster, better-informed decision-making

“Everything you’re about to see runs in a standard web browser with no plugins,” Keith Tallent told the audience at AVEVA World 2022. “It’s all hosted on AVEVA’s cloud-connected environment.” Tallent is the Global Services Manager at KBR, and displayed on the screen behind him was KBR’s latest achievement: the digital twin of bp’s Azeri Central East (ACE) offshore drilling platform. KBR has digitally constructed the entirety of bp’s offshore project a year before its production is scheduled to commence. From fully defined 1D data—all built to bp’s class library specifications—and 2D P&IDs with intelligent hyperlinks, up to the complete 3D engineering model overlaid with the fully integrated laser-scanned environment, every piece of this digital representation is clickable as well as intelligent, and links users to relevant datasets.

KBR, a leading EPC company and global provider of differentiated professional services and technologies, is one of the main contractors working to design, build, and commission bp’s ACE offshore platform in Azerbaijan. Over the past twenty years, the company has been evolving its digital twin solutions. In 2018, KBR enlisted AVEVA to help chart the path forward in its digital twin journey and provide world-class value-added engineering and procurement services for its customers.

Building the foundation for a trusted digital twin

Digital twin technology isn’t a new concept at KBR. “We just didn’t describe what we were doing as digital twins previously,” said Tallent. In the early 2000s, KBR digitalized its business. The company introduced electronic authoring tools for EPC deliverables and implemented electronic document and tag management systems, which enabled it to create an information systems map, connecting engineering, procurement, and commissioning systems. This milestone in digital transformation empowered KBR to pass information between various project disciplines and systems with maximized efficiency and minimal effort. The integrated systems map – which was initially delivered via an internet-facing project portal – formed the basis of a connected, digital environment that we would recognize today as the front end of a digital twin. “In practice,” Tallent said, “this was enabled by the foundational work we did earlier to make our information electronic and our systems talk to one another.”

Fast forward to today, and industry leaders like AVEVA have made significant advancements in their offerings in the digital twin space, which provided KBR with a few of the key pieces its systems information map was missing, Tallent said. KBR’s current engineering digital twin relies on an advanced digital toolkit of AVEVA solutions, including AVEVA Asset Information Management, AVEVA E3D Design, AVEVA Information Standards Manager, AVEVA Engineering, and AVEVA Point Cloud Manager. This suite of industrial software forms the critical integration and presentation layers of KBR’s digital twin solution, which allow KBR to deliver information to end users in a single, connected environment.

Maturing from design and engineering to operations and maintenance

In 2018, KBR built the digital twin at the engineering phase of the ACE project using an on-premises user-facing implementation of AVEVA Asset Information Manager. At that early stage, KBR’s focus was to provide connected access to documents, tag data, and 3D models for the use of EPC disciplines as well as bp’s commissioning and operations team.

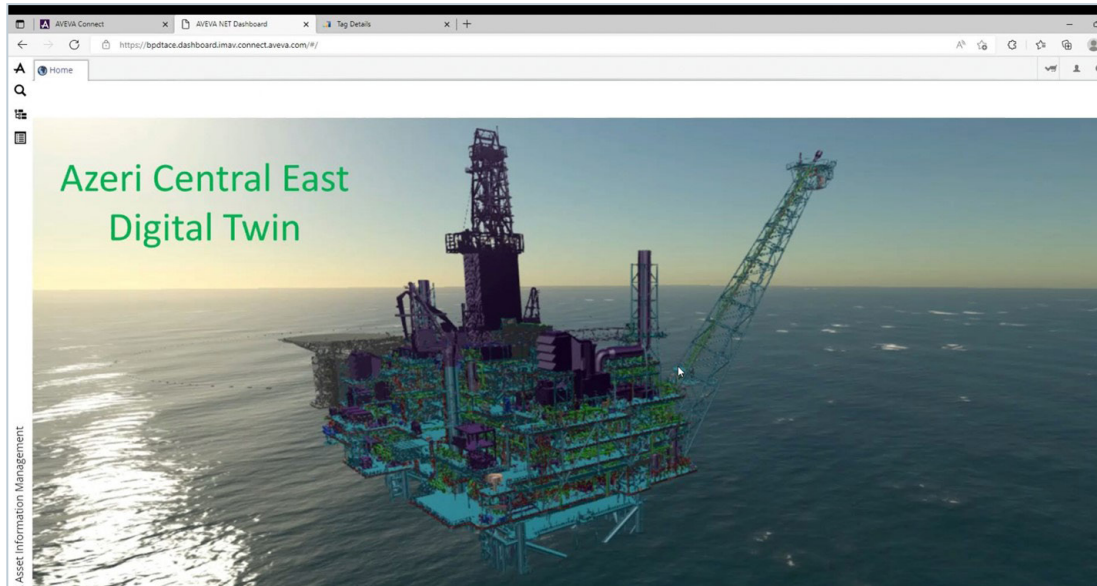
In recent months, the focus has shifted. KBR has begun the transition from the engineering phase of the project to the operations and maintenance phase using its digital twin solution. Now, the digital twin lives in a hybrid-SaaS, customer-owned AVEVA Connect implementation of AVEVA Asset Information Management. This hybrid-cloud implementation of the digital twin is configured using AVEVA Information Standards Manager and takes advantage of simplified gateways between systems of record and the digital twin, providing an enhanced environment for the visualization of the 3D model.

To move ahead in this maturation process of the digital twin journey, the team at KBR has begun using AVEVA Point Cloud Manager to laser scan the ACE platform and overlay the photogrammetry onto the engineering model. Then, after collecting all this information, the team will use AVEVA E3D Design to ensure that what’s designed is exactly what’s built.

Today, bp is in the process of setting up its maintenance and inspection systems. Next year, KBR and bp plan to integrate these systems into the digital twin environment. Soon, end users will be able to navigate effortlessly between all the information sets in a single, integrated environment—all from a standard web browser. “Experience has shown us that this is really important in a collaborative environment with multiple organizations where you don’t have control of other peoples’ IT,” Tallent said.

“End users will have the ability to navigate seamlessly between all the information sets in a single, connected environment. They won’t have to waste time figuring out which system they need to go to in order to access the information they need.”

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Keith Tallent
Global Services Manager, KBR



The ACE digital twin, developed by KBR, is securely accessible on any standard web browser

Achieving a continuous handover and lasting benefits

Handing a digital twin over to a customer requires careful planning and forethought. At all stages of its lifecycle, a digital twin must remain up to date, or else, Tallent said, it can fall into a state of disrepair. That’s why KBR, bp, and AVEVA are working closely to put people and processes in place to ensure the digital twin continues to be a trusted source of up-to-date information. “It’s very much been a three-way partnership between the three companies focused on digital delivery and improving the current standard industry practices,” said Tallent.

To begin the handover process to bp, KBR will connect and deliver O&M information with traditional handover information, which will include the integration of a fully laser-scanned asset prior to the first production, a complete 3D model, and procedures to facilitate the ongoing management of change. But handover doesn’t end at delivery. To ensure that the digital twin remains up to date in the early-operate phase, KBR will leave a small team behind to maintain the system for the next three years.

While production at the ACE platform hasn't yet begun, bp anticipates massive benefits from its digital twin. The company expects that rapid access to connected information will significantly improve operational efficiency and empower its teams to make faster, better-informed decisions. Additionally, Brian Grant, Project Information Manager at bp, said, "It's a gateway for bp to achieve our remote operations vision." With the support of the ACE digital twin, teams at bp will be able to plan maintenance projects remotely, which means fewer trips offshore, and therefore, reduced costs and improved safety.

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- Keith Tallent

Global Services Manager, KBR

Conclusion

In the months and years ahead, KBR plans to continue to expand upon its O&M digital twin environment using KBR Enterprise Visualization Suite, which is based on AVEVA Unified Operations Center. With this new offering, KBR can empower its customers with a sophisticated, integrated environment that will improve their ability to monitor and visualize their operations.

Tallent said KBR is also planning to begin incorporating more immersive technologies into its digital twin solution. With AVEVA XR, AVEVA's virtual and augmented reality solution, KBR wants to rethink the way we interact with the digital world, extend the visualization layer of its digital twin environment, and make its first foray into the industrial metaverse.



KBR is expanding the visualization layer of its digital twin solution with new, immersive technologies from AVEVA

[Click here to watch the full presentation](#)

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