

Dassault Systèmes SIMULIA Analyst Event 2018: New Highlights in Simulating Product, Nature and Life

CIMdata Commentary

Key takeaways:

- CIMdata believes that the SIMULIA brand of Dassault Systèmes has made tremendous progress in simulating product, nature and life. The renewed focus on industry solutions rather than brand products makes it much easier for end users to apply the simulation technology to their specific needs.
- Dassault Systèmes digital healthcare solutions show that SIMULIA's simulation capabilities are now available to a much broader audience and span the entire innovation cycle. CIMdata believes Dassault Systèmes is a leader in providing simulation to the digital healthcare industry.
- With the **3DEXPERIENCE** Twin, Dassault Systèmes makes another step forward in applying simulation technology to our daily life. CIMdata believes that SIMULIA has the major multiphysics and multiscale simulation capabilities to enable the digital twin.

CIMdata recently attended the Dassault Systèmes SIMULIA brand 2018 analyst event at its campus in Johnston, RI. As SIMULIA executives pointed out, with this dedicated event focusing on simulation, Dassault Systèmes continues to demonstrate its commitment towards simulation as a foundational element in achieving its overall vision to “imagine sustainable innovation capable of harmonizing product, nature and life.” By focusing on providing a broad range of industry solutions based on the **3DEXPERIENCE** platform, Dassault Systèmes is utilizing the power of its brands more effectively. SIMULIA's journey to improve and expand its simulation capabilities has been supported through organic research and development and continues with their 2017 acquisition of Exa Corporation to further improve the coverage in bringing multiscale together with multiphysics and science as show in Figure 1. Their strategy to integrate these technologies in the **3DEXPERIENCE** platform allows their customers to connect the dots between the different scales and domains as well as the entire product lifecycle process.

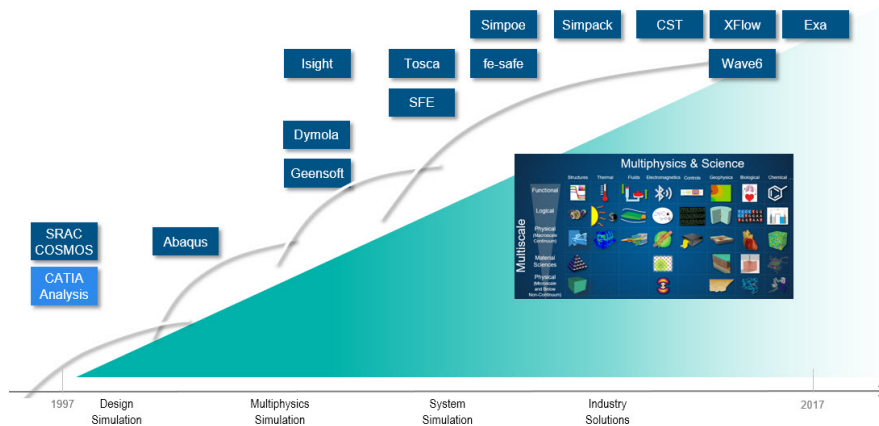


Figure 1—Dassault Systèmes Long-Term Commitment to Simulation
(Courtesy of Dassault Systèmes SIMULIA)

Dassault Systèmes is building an environment with its 3DEXPERIENCE platform that allows customers to enable and use the digital twin. Realistic simulation as provided by the SIMULIA brand is a key factor to achieve this, see Figure 2.

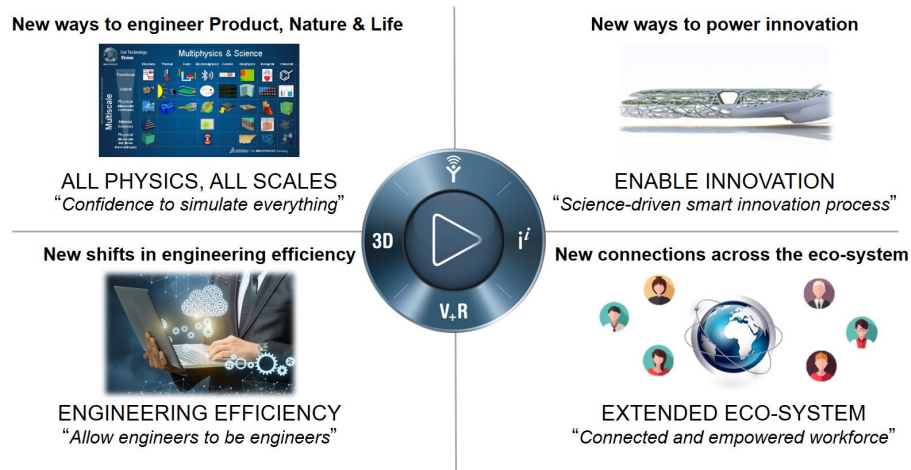


Figure 2—3DEXPERIENCE—A New Way to Simulate
(Courtesy of Dassault Systèmes SIMULIA)

This year’s event was focused on some key areas within the SIMULIA brand that support Dassault Systèmes’ vision to “imagine sustainable innovation capable of harmonizing product, nature and life,” including:

- Additive Manufacturing
- Personalized Healthcare
- Democratization of Simulation
- **3DEXPERIENCE** Twin
- Electric Vehicles

Due to the breadth of the different topics presented by SIMULIA, we are covering two of the five topics in this commentary, which include Personalized Healthcare and the **3DEXPERIENCE** Twin. Additive Manufacturing is covered in a separate CIMdata commentary, and Democratization of Simulation and Electric Vehicles are covered by a commentary from SMS_ThinkTank™ in cooperation with CIMdata.

For each of the topics, the SIMULIA team demonstrated a holistic lifecycle approach enabled by the **3DEXPERIENCE** platform. Focusing more on industry segments rather than brand products allows a closer and more specific interaction with, and among, the end users responsible for various disciplines in the development process. By integrating the simulation capabilities into industry specific processes utilizing the **3DEXPERIENCE** platform, SIMULIA is making their solutions available to a much broader audience than ever before.

Personalized Healthcare

Healthcare is a very complex and data-driven industry. The advances in technology nowadays demands the collection of vast amounts of data, not just in general but for each individual. In addition, new manufacturing technologies allow customization of medical devices as well as personalization of medical treatment. Dassault Systèmes with the simulation capabilities provided by the SIMULIA brand has a leading role in this industry, as shown in Figure 3.

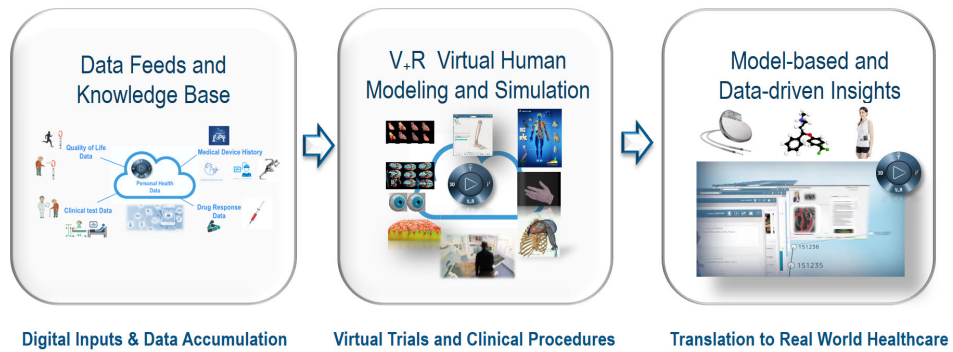


Figure 3—Solutions for Digital Healthcare
(Courtesy of Dassault Systèmes SIMULIA)

Simulation applications within the healthcare industry are being applied to medical devices and have a well-established foundation within SIMULIA supporting simulation of biomechanics of implants, electromagnetic safety of medical devices and sensors, drug delivery, and many more. With the combination of Dassault Systèmes BIOVIA and SIMULIA brands, simulation applications also are widely used within biochemistry in the pharma and biotech industries as well as in very early stages for patient care.

SIMULIA's Living Heart initiative is a good example of how its multiscale/multiphysics and science simulation capabilities can be applied to the medical field. It's supporting all the different areas mentioned above following Dassault Systèmes vision for this industry to “advance the development of safe & effective cardiovascular products and treatments by uniting engineering, scientific, and biomedical experts to deliver validated models and translate simulation technology into improved patient care.”

For those partners participating in this project, the heart model is available on the 3DEXPERIENCE platform (on the cloud or on-premise) which not only brings the various partners together in a collaborative manner but also provides access to data and process management capabilities, simulation technology, thus, allowing one to be innovative at every step of the “medical lifecycle,” see Figure 4.

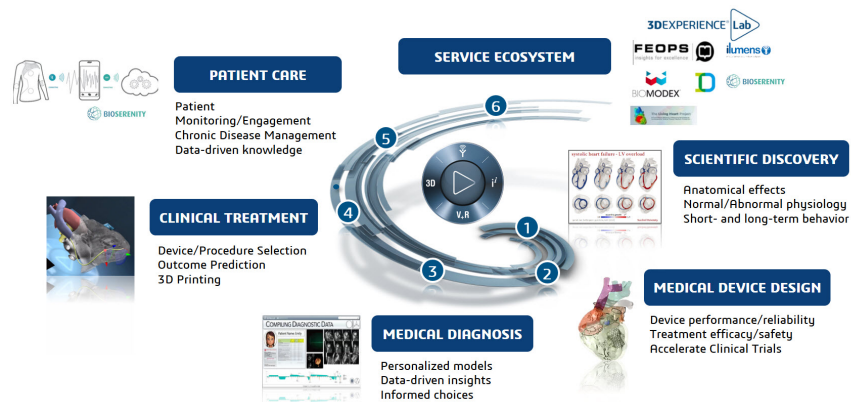


Figure 4—Digital Healthcare allows End-to-End Innovation Throughout the Medical Lifecycle
(Courtesy of Dassault Systèmes SIMULIA)

This project is a very good indicator of where digital healthcare is going utilizing simulation technologies. As a major next step, Dassault Systèmes is thinking about the “Virtual Human.” For this to be achieved, major advances in the realistic representation of the physical human

model have to take place, individual material behavior modeling has to see further improvements, as well as consistent connectivity between real and virtual worlds need to be established. This means essentially the enablement of the digital twin for the healthcare industry.

3DEXPERIENCE Twin

Major trends and changes in technology demand that solution providers be ready to understand and address those trends to make use of supporting technology in their solutions. These trends include, but may not be limited to:

- Internet of Things (IoT)
- Big Data (management and processing)
- Machine Learning and Artificial Intelligence (AI)
- Digital Thread

This is where the digital twin enters the picture. Dassault Systèmes calls this the **3DEXPERIENCE Twin**. Their SIMULIA brand's simulation capabilities combined with the **3DEXPERIENCE** platform provide a good foundation for enabling digital twin capabilities. The **3DEXPERIENCE** platform brings the virtual models and physical parts together and enables the digital thread—supporting data continuity independent of the source of the data and its consolidation.

The maintenance area with products and systems in service is an ideal example for applying the digital twin concept. Typical approaches for fixing products or systems when they are broken or to facilitate a prescribed maintenance schedule are too unpredictable and expensive. Utilizing a predictive maintenance approach based on the specifics of the operating environment, usage history of the product, or probable system failure, can be understood before it becomes critical and too expensive to fix. Such an approach is realized through the enablement of a digital twin to support a predictive maintenance approach. Some companies predict a savings of 8 to 10% in maintenance costs, see Figure 5.

To enable such an approach, in addition to the **3DEXPERIENCE** platform, IoT sensors need to be in place as the source of information from the physical twin. Data processing utilizing analytics must be enacted and proper dashboarding has to be made available to enable making proper decisions.

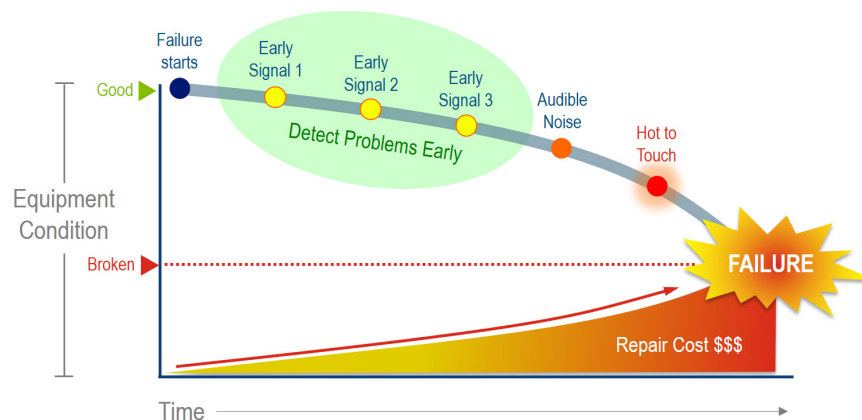


Figure 5—3DEXPERIENCE Twin for Predictive Maintenance and Service
(Courtesy of Dassault Systèmes SIMULIA)

Simulations based on the input from IoT sensors in its multiple scales, domains, and fidelities plays a significant role to feed information into the analytics engine to properly predict behavior for a specific use case in the field. At the same time, simulation can help predict the proper locations of those IoT sensors. With its comprehensive simulation capabilities in multiscale and multiphysics, Dassault Systèmes SIMULIA brand has the foundational elements to execute such predictive simulation and support the enablement of the digital twin—the **3DEXPERIENCE** Twin.

Conclusions

CIMdata believes that Dassault Systèmes has made tremendous progress in both Personalized Healthcare and the **3DEXPERIENCE** Twin. The renewed focus on industry solutions rather than brand products makes it much easier for end users to apply the simulation technologies to their specific needs. The examples of these two topics are proof that simulation has become mainstream in all aspects of our life and is not just used behind closed doors by a specialized engineering department or after-the-fact of a product failure in the field.

Dassault Systèmes digital healthcare solutions show their SIMULIA and BIOVIA brands' simulation capabilities are now available to a much broader audience and span the entire innovation cycle. CIMdata believes Dassault Systèmes is a leader in simulation for the digital healthcare industry. We are looking forward to their next achievements.

With the **3DEXPERIENCE** Twin, Dassault Systèmes makes another step forward in applying SIMULIA's simulation technology to our daily life. The **3DEXPERIENCE** platform as a center piece plays a vital role in enabling the digital twin approach. CIMdata believes that Dassault Systèmes SIMULIA brand has the major multiphysics simulation capabilities to enable the digital twin.

About CIMdata

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