AMD

PARTNER:
zSPACE
SUNNYVALE, CALIFORNIA

INDUSTRY:
VIRTUAL AND AUGMENTED REALITY

CHALLENGES:
MANY STUDENTS DON'T HAVE ACCESS TO REAL-WORLD EXPERIENTIAL LEARNING OPPORTUNITIES–ESPECIALLY IN CRITICAL STEM SUBJECT AREAS

SOLUTION:
zSPACE PRODUCTS COMBINE HARDWARE AND SOFTWARE FOR CAPABILITIES, SUCH AS:

- **THREE-DIMENSIONAL (3D)** RENDERED IMAGES WITH THE PERCEPTION OF DEPTH

- **HAPTIC-ENABLED (HE)** TACTILE FEEDBACK REPLICATING THE SENSE OF TOUCH

- **VIRTUAL AND AUGMENTED REALITY (VR & AR)** FOR ARTIFICIAL OR VIRTUAL ENVIRONMENTS THAT SIMULATE PHYSICAL PRESENCE

APPLICATIONS:
STEM AND CTE SUBJECTS SUCH AS PHYSICS, CHEMISTRY, ANATOMY, GEOMETRY, ELECTRICAL ENGINEERING, AUTOMOTIVE MECHANICS, WELDING AND 3D DESIGN.

CUSTOMERS:
MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT), STANFORD UNIVERSITY SCHOOL OF MEDICINE, UNIVERSITY OF SOUTHERN CALIFORNIA (USC), UNIVERSITY OF TEXAS AT AUSTIN, DUKE UNIVERSITY, CARNEGIE MELLON, JOHNS HOPKINS UNIVERSITY

AMD TECHNOLOGY AT A GLANCE:

- **AMD APU A9-9420**
- **AMD RADEON™ PRO WX3100 EMBEDDED GPU**

zSpace

CASE STUDY

zSPACE TAKES LEARNING INTO NEW DIMENSIONS WITH AMD

VR AND AR VISUALIZATION ENRICHES EDUCATION, MEDICINE AND BEYOND

zSpace equips today's classrooms to be more adaptable, engaging and individualized for students through sophisticated, immersive learning technologies. Their instructional tools enable features like 3D visualization and modeling, haptic and touch feedback, as well as virtual reality (VR) and augmented reality (AR). More than 1,000 school districts, technical centers, medical schools and universities use zSpace around the globe.

CHALLENGES: LIMITED ACCESS TO EXPERIENTIAL LEARNING

Hands-on experience brings to life learning and critical development–especially for science, technology, engineering and math (STEM) and career technical education (CTE). But for many schools, providing these kinds of opportunities to all students can be challenging.

- Environments that are too small (e.g., human blood circulation) or too large (e.g., the universe) to study without specialized equipment

- Potentially dangerous situations for beginners (e.g., flight instruction, scuba diving, handling hazardous chemicals)

- High cost when the real-world equivalent would have precious consumables or expensive access requirements

- Cultural or value-based barriers (e.g., dissection of animal specimens in biology classes)

- Accessibility for students with learning differences and/or special needs

Jobs in STEM fields are expanding faster than non-STEM jobs—estimated to grow to more than 9 million by 2022.[2] To prepare students for these opportunities, schools need tools to extend learning when the real world is inconvenient or inaccessible. The importance of experiential learning to retention and engagement are well documented, and the benefits of hands-on experience can be recreated in virtual environments when not practical or economical in real life. For example, VR training participants retain as much as 80 percent of the material a year later as compared to 20 percent from traditional training, according to Dr. Narendra Kini, CEO at Miami Children's Health System.[3]
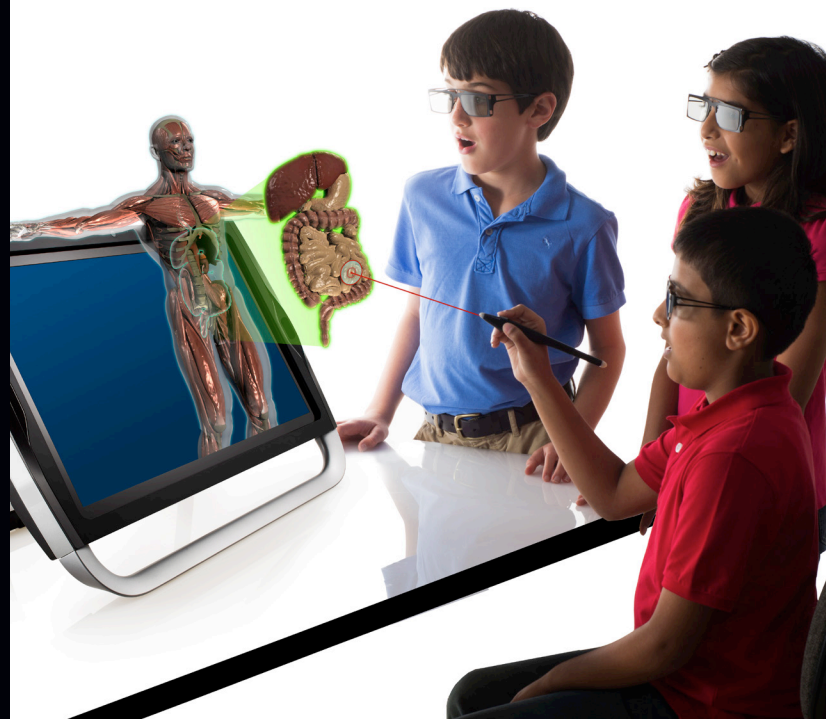
SOLUTIONS: SIMULATION TOOLS FOR IMMERSIVE EDUCATION

zSpace's specialized instructional tools deliver content to students in a realistic, immersive and interactive fashion. Screen-based VR systems enable "fearless learning" in the classroom, facilitating exploration and experimentation without consequences for mistakes or failure. Solutions include:

- zSpace Laptops utilize AR and VR elements to create lifelike experiences for students of all ages and abilities. Their mobile devices offer portability and ease-of-use to teachers and administrators, and are typically used for one-to-one student lessons.

- zSpace All-In-One (AIO) desktop systems also combine elements of AR/VR, enabling experiential learning through student-centered activities that align to core and CTE curricula. The zSpace AIO PRO is designed to run performance-heavy applications, making it an ideal station for developers, designers and CTE schools. These systems are typically used for paired student lessons.

PARTNERSHIP: zSPACE AND AMD – PUTTING POWER INTO IMMERSIVE LEARNING

For several years, zSpace has chosen AMD technologies to power their solutions. Current zSpace AIO models rely on discrete graphics processing from **AMD Radeon Pro WX3100 embedded GPUs**. When designing their first laptop system, zSpace chose the **AMD APU A9-9420** for combined processing and graphics support.

" WHEN DEVELOPING zSPACE PRODUCTS, WE PREFER TO PARTNER WITH TECHNOLOGY PROVIDERS THAT SHARE OUR PASSION AND EXCITEMENT FOR DELIVERING IMPACTFUL EXPERIENCES. "

Dave Chavez, zSpace's Chief Technology Officer

"Working with AMD has been extremely beneficial in developing our products' immense immersive VR content experience capabilities. Instead of just selling us a processor, AMD took the time to clearly understand what we were trying to accomplish. AMD partnered with our engineering team to design a system that provides excellent performance and efficiency without compromising the zSpace experience. This level of support was above and beyond our expectation, and we are pleased to have the AMD badge on our products."

RESULTS: LOS ALTOS SCHOOL DISTRICT – EDUCATION USE

Since 2011, zSpace has worked with the Los Altos School District (LASD) in California to fortify their STEM curricula, broadening the experiences of teachers and students. "When you're able to see the heart pump, that is completely different than anything you are able to do in real life. That's what makes zSpace so different, and such an amazing platform to learn on—you can see something that you will never be able to see in real life," says LASD

teacher Kelly Rafferty. Recent research suggests that use of emergent technologies like VR promotes equal opportunities to learners—especially for underrepresented groups in STEM courses. Girls, for example, report feeling safer taking risks in VR.[4]

RESULTS: LUCILE PACKARD CHILDREN'S HOSPITAL STANFORD – MEDICAL USE

zSpace solutions fulfill needs beyond education, too. zSpace was part of the successful surgical separation of conjoined twins at Stanford's Lucile Packard Children's Hospital in 2016. Sisters Erika and Eva Sandoval had received comprehensive CT and MRI scans in preparation for their separation. Throughout the actual surgery, doctors used a zSpace 3D VR imaging system to view models of the twins' anatomy made from prior radiology scans, which could be rotated and manipulated to better see the internal features.

EXPERIENCING THE WORLD IN NEW WAYS

The successful partnership between AMD and zSpace continues to expand into new virtual tools helping solve real world problems. Other emerging uses for the zSpace platform include retail, gaming and entertainment—overcoming the barrier between people and content.

ABOUT zSPACE

zSpace® powers the global delivery of spatial content. A privately held, venture-backed company located in Sunnyvale, California, it has more than 40 patents. zSpace has already disrupted the education market – more than a million students have benefited from learning with zSpace. Its technology also has applications in healthcare, entertainment, shopping, social media, gaming and more. zSpace was named "Cool Vendor" by Gartner, Inc., "Best in Show at ISTE" by Tech & Learning Magazine for three consecutive years and ranked two years in a row on the Inc. 500 list of fastest growing companies. Visit **www.zspace.com**, or follow **@zSpace** on Twitter.

ABOUT AMD

For more than 45 years AMD has driven innovation in high performance computing, graphics, and visualization technologies— the building blocks for gaming, immersive platforms and the datacenter. Hundreds of millions of consumers, leading Fortune 500 businesses, and cutting-edge scientific research facilities around the world rely on AMD technology daily to improve how they live, work and play. AMD employees around the world are focused on building great products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit **www.AMD.com**

For more information, please visit
www.AMD.com/CorporateResponsibility

1. zSpace Customer Map. Retrieved 20 December 2018
2. "Tomorrow's Jobs Are in STEM," MIND Research Institute, 2 May 2018
3. "The Impact and Potential of Virtual Reality Training in High-Consequential Industries," Training, 25 January 2018
4. "Virtual Reality, Actual Learning," Texas Tech University, February 1, 2017, http://today.ttu.edu/posts/2017/01/virtual-reality

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