XR ASSOCIATION

February 2, 2022

The Honorable Nancy Pelosi
Speaker
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Steny Hoyer
Majority Leader
U.S. House of Representatives
Washington, D.C. 20515

The Honorable James Clyburn
Majority Whip
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Jim McGovern
Chairman
Committee on Rules
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Frank Pallone
Chairman
Committee on Energy & Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Madam Speaker, Mr. Leader, Rep. Clyburn, Chairman Pallone, and Chairman McGovern:

On behalf of the undersigned organizations and universities, thank you for your commitment to solidifying the United States' leadership in scientific and technological innovation through the America COMPETES Act of 2022. Collectively, our institutions play a vital role in advancing technology at every stage, from research and development to production and adoption. We are in complete agreement with you that the United States must increase its investment in the technologies of the future in order to ensure its role as the global leader of the 21st century.

We were, however, disappointed to see that while the Senate included "immersive technologies" in its list of "key technology focus areas" in the U.S. Innovation and Competition Act (S. 1260, Sec. 2005), H.R. 4521 does not include this language. We believe that removing immersive technologies as a priority is a mistake that will seriously undermine U.S. efforts to dominate 21st century technology overall.

Immersive technologies (virtual reality [VR]; augmented reality [AR]; and mixed reality [MR] - collectively known as "XR")[1] are already beginning to transform industries including medicine, healthcare, manufacturing, infrastructure, transportation, and education. XR is also expected to be the next major computing platform. What's more, immersive technologies are contributing to the development of other technologies included among H.R. 4521's specified priorities.

[1] Virtual reality [VR]; augmented reality [AR]; and mixed reality [MR] – collectively known as "XR"- blend the physical environment with virtual content across a spectrum, from fully virtual (occluded) to augmented (overlaid).

Our institutions are investing in XR research, development, and adoption because we recognize the impact this technology will have on science and technology, as well as the benefits it will provide to industry and society overall. Representatives Suzan DelBene (D-WA), Yvette Clarke (D-NY), and Ted Lieu (D-CA) have submitted Amendment 61 to restore "immersive technologies" to the list of key technology focus areas in America COMPETES. ***We write today to urge your support for including this amendment in the final bill.***

Background

The America COMPETES Act rightly identifies as priorities key technology focus areas like artificial intelligence, robotics, and advanced communications. Yet these technologies and others should not be thought of as separate and independent. The world is at the threshold of a Fourth Industrial Revolution in which the physical, digital, and biological worlds will increasingly merge, impacting all disciplines, economies, and industries.[2] The technologies of this Fourth Industrial Revolution must not be siloed. Our focus must be on the interconnected technology ecosystem as a whole, and the U.S. approach to research and development should reflect and foster that symbiosis.

Specifically, immersive technologies will stimulate and support advanced development in other critical technology fields highlighted in H.R. 4521. As an example, we can look to the powerful connection between VR and artificial intelligence (AI). Recently, major advances have been made to bring VR and AI together to create a single form of technology that offers seemingly endless possibilities. Through AI, researchers improve simulations by endowing artificial agents with complex rules that emulate human behavior. Likewise, immersive technologies are helping to advance AI: looking to the evolution of human cognition, researchers posit that immersion of advanced AI agents in virtual worlds - exposing them to essential, real-world conditions and large numbers of human users with whom they must interact - is the special ingredient needed to bring AI to the next level. Indeed, some scientists assert that VR may in fact trigger an evolutionary leap in AI.[3]

The Department of Energy's Artificial Intelligence and Technology Office (AITO) has been focusing on the convergence of AI and immersive technologies, recognizing the significant growth in this space now and in the future. As AITO Director Pamela Isom noted in an interview with Forbes in January 2022, immersive experiences are valuable for training and precision modeling of critical situations such as autonomous vehicle scenarios where sometimes synthetic

[2] Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, first introduced the phrase "Fourth Industrial Revolution" in a 2015 article published by *Foreign Affairs*. Previous industrial revolutions liberated humankind from animal power, made mass production possible and brought digital capabilities to billions of people. This Fourth Industrial Revolution is, however, fundamentally different. It is characterized by a range of new technologies that are fusing the physical, digital, and biological worlds, impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human. (see https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab).

[3] "Artificial Intelligence and Virtual Worlds – Toward Human-Level AI Agents," Vladimir M. Petrović, Institute of Electrical and Electronics Engineers (IEEE), 2018. Available at https://www.goldmansachs.com/insights/pages/virtual-and-augmented-reality.html

data is safer and not as invasive as real-time data.[4] DOE, one of the most science, technology, and innovation-focused U.S. federal agencies, continues to invest in this transformative technology.

XR is also a key part of the new-generation information and communications technologies ecosystem and will play an important role in driving the transformation and upgrade of core components, extensive smart devices, network transmission devices, cloud computing devices, telecommunications services, and software. The development of XR itself is also inextricably bound to near-eye display, rendering processing, spatial computing, perception and interaction, and network optical transmission (a technology area that is articulated in H.R.4521's list of focus areas). Even 5G itself will be impacted. The ultra-high bandwidth, ultra-low latency, and ultra-high mobility of 5G enable the advanced the immersive experience. As XR becomes a key area of 5G commercial use, 5G technology will improve to meet its requirements.

There are myriad other examples we could provide. But the larger point is this: it is the convergence of emerging technologies that will unlock the next wave of innovation, yielding new enterprise solutions that are greater than the sum of their parts. ***Our focus must be on the future technology ecosystem as a whole – which includes immersive technologies as a critical member.***

U.S. Competitiveness and Blunting China's Rise

U.S. allies and adversaries alike have recognized the outsized potential of immersive technology. ***In particular, China has taken impressive steps towards controlling XR's future. XR is featured prominently in the Made in China 2025 strategy***, and the Ministry of Industry and Information Technology, the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Culture, and the Ministry of Commerce have all developed detailed strategies concerning XR. In addition, Chinese provincial and municipal local governments are proactively building industrial parks and labs to promote the development of local VR industries.[5] ***Experts anticipate that XR will be the next major computing platform*** (predecessors being the personal computer in 1984; the World Wide Web in 1993; and the smart phone in 2007), enabling an unprecedented leap forward in human enterprise.[6] We must not cede the field to China and others. Technology reflects the culture and values of the people who create it, and U.S. leadership in this area will ensure immersive technology is used to advance an open and flourishing society.

The DelBene/Clarke/Lieu Amendment

Immersive technologies will play a preeminent role in achieving our national goals related to national security, economic competitiveness, domestic manufacturing, healthcare, education,

[4] "How the US Department of Energy is Transforming AI," Kathleen Walsh, Forbes, January 22, 2022. Available at https://www.forbes.com/sites/cognitiveworld/2022/01/22/how-the-us-department-of-energy-is-transforming-ai/?sh=2e9ad0bc1cbe

[5] "Virtual Reality/Augmented Reality White Paper," China Academy of Information and Communications Technology (CAICT), 2017. Available at: https://www-file.huawei.com/-/media/corporate/pdf/ilab/vr-ar-en.pdf

[6] "Accelerating the Next Computing Platform," Medium.com, January 28, 2020. Available at https://michaeltefula.medium.com/accelerating-the-next-computing-platform-fb3ed88d01e1

agriculture, transportation, and workforce development – and will serve as a catalyst for advanced development in other critical technology fields as well. As a transformative technology in its own right and natural member of the cohort of technologies highlighted in the bill, immersive technology should be included in H.R. 4521.

Because of the magnitude and ubiquity of immersive technology's coming impact, as well as its synergistic effect on the development of adjacent technologies named in the America COMPETES Act, we urge you to support Amendment 61, the DelBene/Clarke/Lieu amendment to add "immersive technologies" to the bill.

Thank you for your consideration.

Sincerely,

Elizabeth Hyman
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