

CENTRE FOR JOINT WARFARE STUDIES



CENJOWS

CHINA'S VIRTUAL REALITY ADVANCEMENTS

VIRTUAL REALITY CAPABILITY DEVELOPMENTS IN CHINA.

1. The hardware and software Virtual Reality capability developments of certain key players around the world are driving growth of the digital reality market at a rapid rate. The hardware market is relatively captured by larger organisations, such as Facebook with Oculus and HTC with Vive. The software market is also led by big players, such as Apple with ARKit, which was launched in competition with Google's ARCore. Alongside these prominent names, a booming ecosystem of start-ups is making a mark in the digital reality space.
2. VR has been used extensively in the entertainment industry and simulation. It has also many possible applications spanning various economic sectors, with relevance to public and national security interests such as Remote-Aircraft Maintenance collaboration through experts; Vehicular repair and maintenance in the battlefield; Tele-robotic and tele-presence in undersea activities and Digital twin of navy ships and engines. Tactical augmented reality (TAR) applications to improve situational awareness include law-enforcement training, empathy training, military situation awareness, health treatment, data analysis, counterterrorism, travel, and cultural awareness in addition to entertainment. Besides, augmented reality can provide helmet-mounted AR display, and Synthetic Training Environment (STE) in warfare. US has been leading the world in the development of reality technologies until recently.
3. China has intensified its efforts to match or even surpass US in the reality technology development efforts. It is developing two VR Towns, also known as VR Cities. Each VR town will employ various VR applications such as medical, education,

business, design, and entertainment fields. Also, the town have planned to have industrial parks that will help facilitate different aspects of the VR supply chain¹. The structure of China's government provides its executive a unique ability to select technologies as focal points and quickly mobilize relevant sectors of the economy. China has already facilitated two public-private strategic industry partnerships to organize the industry, and it has ensured VR's inclusion in notable policy initiatives such as Made in China 2025 and the 13th Five-Year Plan².

4. The ongoing development of 5G ICTs will have positive impacts on the VR and AR sectors, especially in education, healthcare, entertainment and telecommuting. The compound annual growth rate of China's VR and AR market over the next five years is expected to be 67.5 percent, but it will take some time to be widely accepted by the public³. Chinese tech giant ByteDance, the owner of popular short video-sharing app TikTok, made its first foray into VR by acquiring Pico, a Chinese VR headset maker⁴. Founded in 2015, Pico emerged as the world's third-largest VR headset maker in the first quarter of 2020, followed by Facebook's Oculus and Chinese company DPVR, according to global market consultancy IDC. IDC also predicted that, global VR products will grow at the compound growth rate at about 48 percent up to 2024. In 2025, global AR equipment shipments will reach 24.4 million units⁵.



(A visitor tries Pico's VR device during an expo in Qingdao, Shandong province. Photo by Wang Haibin for China Daily)

¹William Shumate and Tim Marler, *Reality Check: China Is Paving a Path Toward the Virtual Future*, 22 August 2021. *The national Interest*. <https://nationalinterest.org/feature/reality-check-china-paving-path-toward-virtual-future-192127>, 05 November 2021.

² *ibid*

³ FAN FEIFEI, *VR, AR to boom on metaverse, the new frontier*, 02 Sep 2021. *The China Daily*. <http://www.chinadaily.com.cn/a/202109/02/WS61302575a310efa1bd66cc2c.html>, 05 November 2021.

⁴ *ibid*

⁵ *ibid*

5. Besides, augmented reality has three major applications namely Tactical Augmented Reality (TAR), helmet-mounted AR display, and Synthetic Training Environment (STE) in warfare.

6. VR training and AR training both have a plethora of use cases for military training in the Army, Navy and Air Force that enhance the quality of personnel training and increase their chances of carrying out successful missions. Some of the uses of VR and AR likely to be exploited more effectively by the PLA Branches are: Electronic Warfare training; Firearm Training; Sniper Training; Armoured Vehicle Simulator; Vehicle Repair and Maintenance in the Battlefield; Situational Awareness and Experience; Maintenance Repair and Overhaul Training; Medical Training; Flight Simulation; Virtual Ship Bridge and Virtual Submarine Simulator. China's state-owned *Global Times* has already reported quoting defense experts that The People's Liberation Army (PLA) has started to use virtual reality (VR) technologies in training as it allows officers and soldiers to gain enhanced combat capability more efficiently⁶.

7. With more than a hundred AR/VR start-ups set up in the past three years, the AR/VR market in India is also expected to register a compounded annual growth rate of more than 50 percent in the next five years according to a Deloitte Survey. Presently, despite progress in the adoption of VR-based products, such as head-mounted display among end-users, the VR market in India is seeing a slow response. Organisations are only in the early stages of AR and VR adoption. Many start-ups are working on solutions for industries, such as real estate, hospitality, gaming, and retail. Start-ups like 'Digital Agents Interactive Private Limited', has been involved in collaborating with the defence forces. Founder Mohit Ramani, while speaking to Deloitte, articulated how he had a clear view of the problem statement he was looking to solve, and developed defence-specific solutions that have been successfully deployed by various departments. Another Start-up 'Staqu Technologies', through AI-and AR-based solutions, has been aiding government authorities to address security and defence related issues over the past few years through applications such as smart glasses equipped with zoom features and facial recognition, to combat terror situations in crowded settings.

8 AR is effective for warfare simulations, military sand tables, battlefield visualisations, and other applications that place a high premium on the realistic representation of defence activities⁷. The use of AR in defence can also take the form of smart glasses and displays that present information regarding spatial orientation, situational awareness, weapons targeting, digital terrain, and other critical data, to mitigate lapses in safety, speed, and coordination. Devices can also allow soldiers to familiarise themselves with features such as night vision, thermal sensing, and applications that measure vital signs during training⁸.

⁶Mansij Asthana, *China Turns To Virtual Reality (VR) Technology To Hone Combat Skills Of Its Soldiers*, 24 march 2021. *The Eurasian Times*. <https://eurasianimes.com/china-turns-to-virtual-reality-vr-technology-to-hone-combat-skills-of-its-soldiers/>, 05 November 2021.

⁷*Virtual, augmented, and mixed reality for defence and the public sector*, https://www2.deloitte.com/content/dam/Deloitte/in/Documents/about-deloitte/in-about-deloitte-Digital%20Reality%20in%20Defence_Final%20print.pdf, 18 November 2021.

⁸ *ibid*

9. Smart helmets are an example of VR applications in the field. Many other use cases for the defence forces are: Remote collaboration through experts, Tele-robotic and tele-presence, Vehicular repair and maintenance in the battlefield, Digital twin of navy ships and engines, Tactical augmented reality (TAR) to improve situational awareness with night vision for soldiers, Immersive training, Situational awareness based training, Multi-user war planning systems, VR-enabled process assessment and Medical training and on-ground emergency support⁹. Indian Defence Forces are already making use of simulators in a big way and are expected to adopt emerging VR, AR and ER capabilities in due course.

⁹ *ibid*