DEFEND3D - Democratizing innovation

Having the ability to develop something in the digital world and deliver it through technology has led to tremendous achievements within Industry 4.0, but concerns around IP and cybersecurity have always been a well-known threat, particularly in additive manufacturing.

According to Wohlers Report 2021, the additive manufacturing industry grew by 7.5% to nearly $12.8 billion in 2020. As the market expands, companies and designers are encountering new challenges, including how best to protect their intellectual property. DEFEND3D's software solution, Virtual Inventory Communications Interface (VICI) is enabling end to end secure transmission for remote additive manufacturing with its One-Click Print.

The company's founder, Barrett Veldsman, spent years working as a creative director for some of the world's top automotive, fashion, and sports brands before launching DEFEND3D. His experiences on a project with Bugatti inspired him to fill a niche in the market that for which there was significant pent-up demand, as he recounted:

"My background exposed me to the issues of IP theft that surround 3D printing when I discovered that one of my custom designs was not only being shared without my permission, it was being sold online for profit. It was this experience that made me aware that this is something many designers face when distributing their work online."

The primary cybersecurity risks in 3D printing concern IP theft and additive manufacturing sabotage. Cyber attacks frequently occur in many sectors of the economy, including the manufacturing sector, which is particularly susceptible due to the access to controlled unclassified information. This extends from general up to fundamental components, and can result in equipment malfunction, and lead to secondary production processes in the full AM digital chain, affecting brand equity of the original equipment manufacturer's product.

Barrett Veldsman
Founder - DEFEND3D

Based in Imperial College London, Veldsman and his team created VICI. This took time, effort, and significant innovation. The result was so successful that the team was invited to join the Institute for Security, Science and Technology, later completing a successful pilot study with the British Ministry of Defence's Strategic Command Division. The MOD found that the team's patented streaming algorithm could be used to address serious present and future challenges in supply chain readiness, digital manufacturing, and cyber security as there is no data at rest in the remote location, and the original manufacturing file never leaves.

"We assess this to be a game-changing capability, allowing us to overcome our current reticence of sending sensitive parts overseas, and allow us to send more parts wherever we wish in the world," stated Lt. Col. *****. "Being familiar with cutting edge 3D printing technologies, I believe this to be the only such system on offer."

In maintaining their vision to democratize 3D printing, DEFEND3D have established their One-Click-Print functionality, lowering the training burden required. Therefore, a specialist is not required at the point of manufacture which means that anyone, whether they are maintenance staff, a soldier or anyone else who does not have expertise in manufacturing, can print on demand.

DEFEND3D have recently published their white paper, co-authored by Microsoft, titled 'Intellectual Property & Cyber Security in Additive Manufacturing within the Defence Sector'. This highlights the results of benchmark testing with the UK MOD to show that manufacturing and part integrity were not affected using the DEFEND3D transmission service at a low bandwidth and high latency, in comparison to a standard SD card print. https://defend3d.com/Home/whitepaper

Veldsman's future vision of the VICI solution is to disrupt the additive manufacturing industry by offering a transmission protocol and enabling companies within the sector to deliver on demand customization to adapt to remote environments such as Arctic, suborbital (ISS), Lunar or Martian surfaces.

Shipping materials into remote locations are extremely expensive and time-consuming, but VICI would allow spare parts and core infrastructure to be created or modified to the exact same quality and specifications intended by the CAD engineer through a remote stream to the printing device.

"VICI was built to enable secure transmission of 3D printing, CNC, laser cutting, bio-printing and other manufacturing data for governmental defence, pharmaceutical and manufacturing organisations by offering a patented encryption and transmission protocol. By putting our protocol in the hands of industry, the result will truly democratize innovation." he concluded.