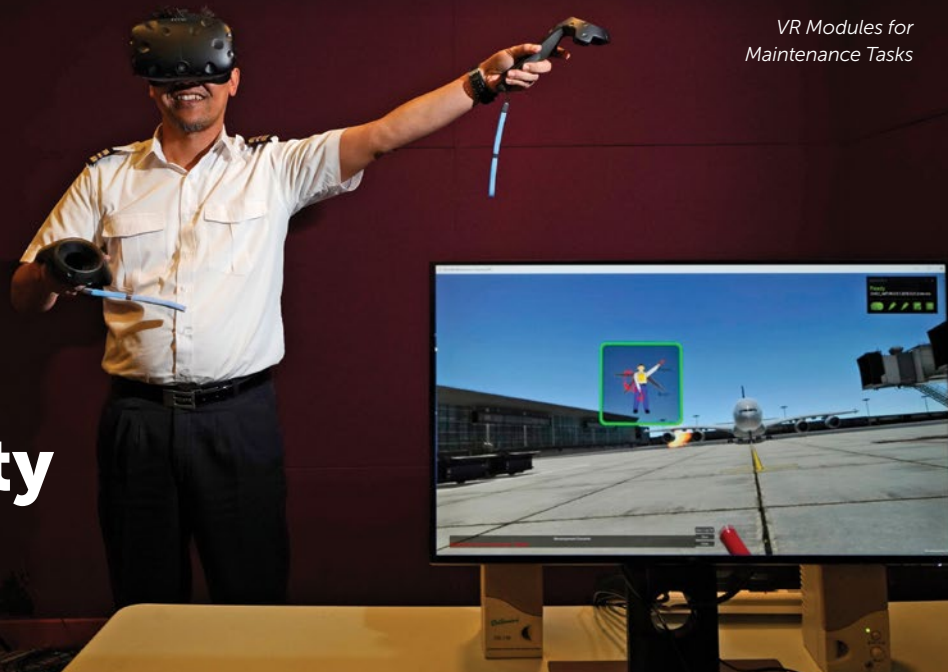*VR Modules for Maintenance Tasks*

Case Study:
How We Use Technology to Advance Aviation Safety

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Digital transformation is inevitable. It challenges every industry and business to rethink their operations and business process. Similarly, digital transformation is no stranger at one of the world's leading aircraft maintenance, repair and overhaul (MRO) companies — SIA Engineering Company (SIAEC). Advancements in digital and technology capabilities have not only strengthened our competitive edge in delivering high quality, value adding and efficient services to airline customers, but also our strong track record in aviation safety.

Complementing Training with Simulation Scenarios
A typical Licensed Aircraft Engineer (LAE) training cycle, comprising classroom and on-the-job training, lasts 44 months. While classroom training focuses on fundamental theory and uses schematics, pictures and videos to illustrate complex aircraft components and their mechanisms; on-the-job training exposes LAE trainees to real aircraft maintenance environment and is essential for supplementing classroom training.

To enable more exposure to realistic aircraft maintenance environments in a safe and controlled manner for LAEs who are new to Line Maintenance operations, we co-developed virtual reality (VR) maintenance training modules to model and simulate maintenance tasks under various scenarios. These scenarios, created based on key critical tasks and processes, enhance the training experience and reinforce high safety and quality standards.

Additionally, we launched a new Mobile Elevating Work Platform (MEWP) simulator to enhance operators' proficiency on the safe use of powered access platforms. Proper delivery of safety checks, service and repairs without injury or costly damages requires operators to be extremely precise when positioning access platforms around parabolic structures. Through simulating aviation-centric situations and hangar and airside operating environments, the MEWP simulator enables operators to use VR headsets together with an integral aerial work platform to practise operating powered access platforms in a risk-free environment.

Improving Airside Driving Safety
As part of SIAEC's continued efforts in improving airside driving safety, a towing simulator is deployed for trainees who have completed their theory lessons, or are undergoing refresher and corrective training. Replicating challenging scenarios, the simulator not only trains air tug drivers' responses to emergencies, but also allows them to experience effects of undesirable practices. Notably, the simulator has also reduced the air tug training programme by a day.

A VR driving simulator mapped to Changi Airport's terrain was also developed to enable drivers to undergo a realistic scenario-based evaluation before their license renewal. Similar to the towing simulator, SIAEC created uncommon and impossible-to-stage scenarios of potential incidents — enhancing awareness of emergency situations that are difficult to train for in real settings.

Driving Continuous Improvement
As part of our ongoing transformation journey, SIAEC will continue to invest and trial emerging technologies such as Augmented Reality (AR), VR, Internet of Things (IoT) and machine vision to drive productivity and quality improvements — and further advance aviation safety.