"**The Next-Generation Image Generator for Immersive and Modular Aircrew Training**" (Reported by Cdr Dino Tropea)



Training is a vital component of military and commercial aviation, as it prepares pilots and crew members for various scenarios and challenges they may encounter in the real world. However, traditional simulation and training solutions often lack the realism, flexibility and scalability that modern missions and operations require. To address this gap, Collins Aerospace, a business unit of RTX, has introduced a new image generator that combines advanced rendering and processing tools with gaming technology to deliver immersive and modular aircrew training. The image generator, called Arcus, is designed to provide realistic and complex synthetic training environments for various platforms, including military and commercial aircraft.

Arcus is developed in partnership with Epic Games, a gaming engine developer that provides Unreal Engine technology. Unreal Engine is a powerful and versatile tool that enables the creation of stunning and interactive 3D content for various applications, such as gaming, film, architecture, and education. By using Unreal Engine, Arcus can leverage the latest graphic capabilities and features, such as ray tracing, dynamic lighting and shadows, volumetric effects and physics-based rendering, to create high-fidelity and immersive simulation scenarios. Arcus also uses common PC hardware and software applications to support different types of simulated flight devices, such as full-flight simulators, flight training devices, and virtual reality and mixed reality systems. This reduces the cost and increases the opportunities for focused training using the same technology across the simulation spectrum.

Arcus also features a flexible and open systems architecture that allows customers to adapt their training environments and implement new features as their missions and simulation training needs evolve. The image generator's combination of advanced visuals and Epic Games' adaptable gaming technology enables high-fidelity and dynamic simulation scenarios that can be customized and modified according to the customer's requirements and preferences.. For example, customers can change the terrain, weather, time of day, and other environmental factors to create different conditions and challenges for the trainees. Customers can also integrate their own models, assets and data into the simulation environment to enhance the realism and relevance of the training.

“Effective simulation training requires high-fidelity visual realism, and customers also need these technologies to seamlessly adapt to their varied training needs and devices,” said Sharon Tabori, senior director and general manager of Simulation and Training Solutions for Collins Aerospace. "Our new hybrid image generator brings improved graphic capabilities to offer flight simulation experiences that are as efficient as they are realistic."

Arcus is the latest addition to Collins Aerospace’s portfolio of simulation and training solutions, which includes part task trainers, mission crew trainers, virtual avionics procedure trainers, and head-up display virtual reality trainers. Collins Aerospace has been a simulation and training solutions provider for various military and defense platforms, such as the E-2 series of aircraft, the KC-46 tanker, and the F-35 fighter jet.

Arcus was showcased at I/ITSEC 2023 in Orlando, Florida, in last November. The companies will exhibit next-generation constructive simulation environments, digital twins of the Earth for simulation, and the most advanced synthetic training environments. Attendees will see how the collaboration harnesses real-time and forecasted weather into common terrain models and use cases for the military, such as air defense, infantry, communications, and special operations.

Arcus is a game-changer for aircrew training, as it offers a new level of realism, flexibility and scalability that can enhance the skills, performance and readiness of pilots and crew members. By using Arcus, customers can access the most advanced and adaptable simulation and training solutions that can meet their current and future needs.

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