Success Story

STTS and SGI Co-Pilot Visual Simulation Solution for Republic of Singapore Air Force

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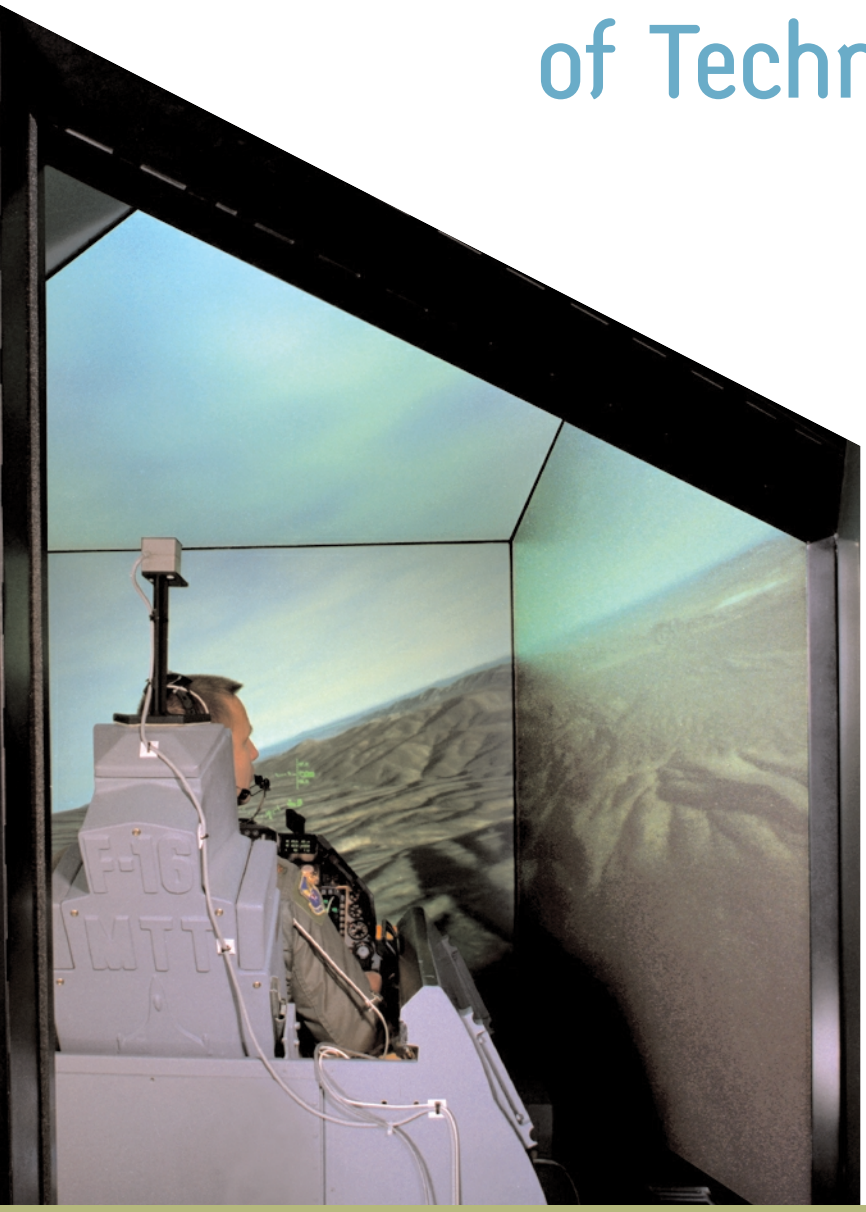
—Pritam Singh, Chief Operating Officer of STTS

Superior Imaging Capabilities, Adherence to Open Standards, and a Long-Term Commitment of Technical Support



Since achieving its independence in 1965, the Republic of Singapore has attained status as a world-class industrial and financial power. The nation boasts one of the highest standards of living in Asia and is home to one of the world's busiest ports, strategically situated in the heart of vital Pacific trade routes. Singapore maintains sophisticated armed forces that include army, air force, and naval units. Training this military force poses unique challenges to an island nation spanning just 700 square kilometers of land and airspace.

One training strategy successfully employed by the Singapore military is the utilization of simulation systems that allow tactical and strategic exercises to take place in virtual geographies. This strategy applies an extensive and comprehensive set of simulation and training systems to cope with Singapore's scarcity of land. The latest simulation system acquisition—a fixed-wing aircraft Operational Flight Trainer (OFT)—results from the Republic of Singapore Air Force (RSAF) arsenal modernization program. ST Training and Simulation Pte Ltd (STTS) is a wholly owned subsidiary of ST Electronics Limited, which is a wholly owned electronic arm of Singapore Technologies Engineering Ltd, Singapore's largest engineering organization. Currently under development by STTS, the OFT simulator incorporates high-performance imaging technology from SGI. This technology allows the generation of geospecific imagery so realistic that air force pilots will be able to replace in-the-air training time with simulator time—an exchange that pilots were unwilling to make using earlier, less-immersive simulation solutions. The new system promises millions of dollars in savings for Singapore. It will also eliminate the practical geographic boundaries of the real world, giving pilots virtually unlimited airspace in which to hone their aviation skills.

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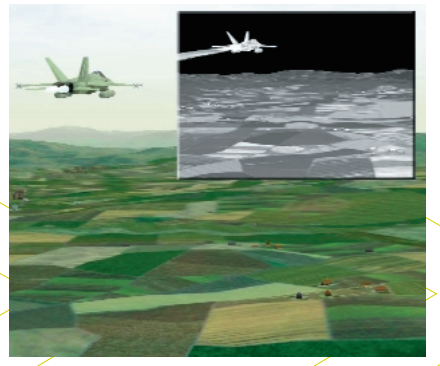

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The Sky's the Limit

The RSAF began its search for a total simulation solution in early 1999. Technical specifications were drawn up by the Defense Science and Technology Agency (DSTA), a department within the Singapore Ministry of Defense that manages technology and systems for the military. A tender was issued by the DSTA, resulting in a winning bid from STTS, employing Silicon Graphics® Onyx2® InfiniteReality®. Throughout the selection process, the STTS and SGI teams worked closely together to translate the RSAF's visual requirements into hardware and software specifications and to provide system benchmarking and feature demonstrations. A critical component of the solution was the ability to display geospecific images—out-the-window views of large landscapes. Because of the expense and complex logistics of actual in-the-air training missions, the RSAF needed to deploy a simulator system that was accessible and cost-effective and yet would not compromise the quality of pilot training.

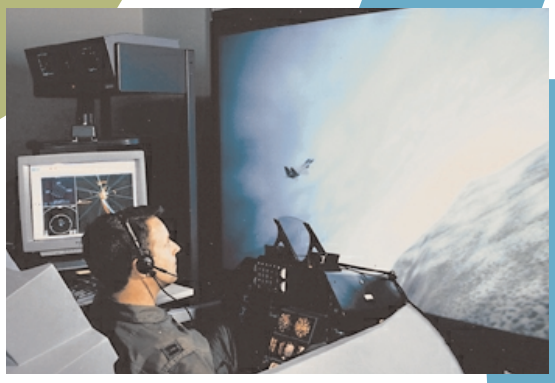
After a nine-month evaluation of the alternative solutions, the DSTA chose the simulation system based on SGI™ technology proposed by STTS. Determining factors included superior imaging capabilities, adherence to open standards, and a long-term commitment of technical support and guaranteed access to the latest technology. SGI's proven track record with international high-fidelity graphics systems was also a key factor in the vendor-selection decision. The STTS solution gives pilots the immersive reality they need to train effectively and provides the RSAF with a scalable, future-proof architecture.

Visual Simulation Requirements: Graphics Bandwidth and Database Capacity

The STTS fixed-wing OFT incorporates a 16-processor Onyx2 InfiniteReality3™ system with three graphics pipes and eight Raster Managers. The projection system is supplied by SEOS and includes four high-resolution displays that enable a 180-degree high-resolution cockpit field of view. The remaining field of view is of a lower resolution. The software development team utilizes a number of SGI tools, including IRIS Performer™, OpenGL®, and other SGI compilers, as well as MultiGen-Paradigm software for visual database creation and management.

The STTS solution offers several important technical advantages over the other alternative proposals reviewed by the DSTA. Based on the high-performance Onyx2 InfiniteReality3 system, the STTS OFT delivers a screen resolution of 1280x1024 at a guaranteed 60 Hz update rate, plus the graphics bandwidth and capacity needed to manage extremely large visual databases. No other system evaluated could deliver the highly realistic, immersive environment required to meet with the approval of the very demanding RSAF aviation users.

Pritam Singh, chief operating officer of STTS, commented, "While many PCIG solutions claim to deliver the image quality we need, none that we evaluated was able to provide a sufficiently fast load and refresh of our visual databases. We knew that without adequate graphics bandwidth and performance to realistically mimic the real-world environment, our cockpit out-the-window visual displays would never have passed the scrutiny of our end users."



The Power of Partners

The success of this simulator program reflects in large part the benefits of a team approach to building and delivering high-function, customized solutions. From the presales process through the ultimate deployment, STTS and SGI work closely together to provide a visual simulation system precisely tailored to the unique needs of the RSAF. STTS, as the prime contractor, brings to the integration project its extensive knowledge and experience with aircraft specifications, military user training requirements, and leading-edge simulation technologies, including high-level architecture, computer-generated forces, computer-generated imagery, and real-time kernels. SGI contributes leading-edge visual simulation technology and backup support for the STTS technical team.

A decade-long relationship between STTS and SGI has helped participants clearly communicate and develop an in-depth understanding of the requirements of Singapore's military. The long-term association has also provided a measurable track record of solution delivery, giving the DSTA confidence in STTS's and SGI's ability to successfully deploy the OFT simulator. According to Singh, "We did give serious consideration to other providers and solutions, including lower-cost PC implementations. But we know that upfront costs represent only a fraction of total project costs. When you consider the cost of implementation and development, proven SGI technology continues to give us the absolute best value."

The Long-Range Vision

STTS expects to deliver the simulation system to the RSAF next year. A key element of that delivery includes a corporate commitment by STTS to deploy the latest processor and visual simulation technology available at the time of solution delivery. Singh explained, "With a system so complex—one that requires a significant development cycle—it is critical to plan for integration of the latest technology. SGI offers a highly scalable, extensible architecture that guarantees we can technically accomplish that. And perhaps most importantly, SGI guarantees that there will be no unplanned costs required to provide the most up-to-date solution to the RSAF. SGI not only has shown an understanding of the user environment, but also has made a corporate commitment to support both STTS and the RSAF throughout the process."

The system will initially be deployed to provide procedural, tactical, and mission training on the fixed-wing aircraft. Future plans may include deployment of additional aircraft simulators, as well as expansion of functionality such as implementation of a full high-resolution 360-degree cockpit field of view.

For more information on STTS and SGI, visit these Web sites:

STTS: ***www.stts.st.com.sg***
SGI: ***www.sgi.com***

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