ISSUE 13

FLYING WITHOUT WINGS

Training pilots to fly aircraft proficiently is now safer and more efficient thanks to rapid advancements in flight simulator technology.

There was a time that the only way to learn to fly an aircraft was to get on an aeroplane and take to the air. But today, technology has progressed so greatly that a large portion of pilot training is now conducted on flight simulators located within flight training organisation (FTO) compounds rather than on an actual aircraft. These simulators are so advanced that they mimic real flight conditions, exposing trainee pilots to highly realistic experiences so that they learn to fly an aircraft and handle flight situations while on the ground, making it a safer and more convenient process.

The competency of pilots in handling aircraft skillfully is key to achieving flight safety. The Civil Aviation Authority of Singapore (CAAS) ensures that the simulator technologies adopted by FTOs meets international standards established by the International Civil Aviation Organization (ICAO). FTOs are able to implement effective training programmes by leveraging these cutting-edge equipment to train pilots to fly in various aircraft type, which ranges from small single-engine piston aircraft to larger aircraft such as the Boeing 777.

Bridging Skies speaks with Captain Quay Chew Eng, Vice President/Chief Pilot Training, Singapore Airlines (SIA) Flight Crew Training, and Adrian Cheok, Vice President/Dy General Manager of Operations, ST Aerospace Academy (STAA) who shed some light on how flight simulators benefit trainee pilots and accelerate their training.

How effective are simulators in mimicking real flight conditions and, by extension, training pilots successfully?

Quay: The technology used in flight simulators have come so far today that when pilots fly the simulator, the experience is almost similar to flying an actual aircraft. The simulators are exact replica of aircraft cockpits and programmed to move and respond realistically to pilots' manoeuvres.

To ensure that pilots continue to receive the best training possible, simulator manufacturers work on every aspect of the technology, both hardware and software, so that the realistic quality of the simulator's experience will not be compromised.

For instance, hydraulic motors are giving way to electric motors, which make simulator movement less jerky and give it a more refined feel like a real aircraft. Improvements have

also been made to the images projected in the simulator screen. Now with advancements in digital technology, high-definition imagery and three-dimensional rendering, they are clearer and more life-like. Scenes of the aircraft at Changi Airport or on a long-haul flight from Singapore to New York can now be realistically re-created in the simulator. Details such as a 14-hour flight journey are easily replicated by the programme in real time in the simulator.

How has simulators accelerated pilot training?
Cheok: With simulators, it is easier to plot the learning curve of the pilot and execute his training sequentially by developing flight scenarios progressively until he finally gets to the desired competency level. The training will also not be constrained by inclement weather, availability of aircraft and hazards of actually flying certain abnormal situations that a pilot might encounter in an emergency.

Quay: Flight simulators are useful in allowing trainee pilot to learn through observing his mistakes and problems closely and solving them with the instructor through the playback function. Exercises can be replayed, lapses and mistakes identified and highlighted as learning points for the pilots attention.

What are the advantages of training with simulators as opposed to training on an actual aircraft?
Cheok: One of the best advantages that simulators offer is to train pilots to deal with various, sometimes dangerous, flight emergency scenarios. Abnormal situations like engine or instrument failures can be mimicked with a simulator wherein the pilot is taught to react and handle these situations within the safety of the training device. This enhances their expertise in managing such situations and even averts disasters.

Quay: On a more operational level, the simulators facilitate a safe and convenient training process for the pilots, passengers and even the environment. They can be used 24 hours a day, seven days a week and thus trainee pilots need not wait around for aircraft or airspace to be available to train. Also, as these devices are indoors, their sessions would not be disrupted by the weather. Moreover, pilots use the simulator to practise these manoeuvres and conduct exercises that would otherwise risk the safety of the aircraft and its passengers if they were to be performed in an actual aircraft. In addition, using simulators are also eco-friendly as compared to flying an actual aeroplane as we are able to spend several hours training without burning fuel and emitting carbon into the atmosphere.

What are the various programmes that can be found in your simulators?
Quay: SIA today has a total of seven full flight simulators located within the SIA Training Centre. The interior of these simulators are exact replicas of aircraft cockpits found on the Airbus (A) 380, A330, A340, Boeing (B) 744 and B777. When a new aircraft model is added to the fleet, we will procure the respective simulator to train our pilots. The selections within

the programme are massive and comprehensive, allowing us to train the pilots through myriad emergency situations, different airport configurations and weather conditions.

Cheok: For our Commercial Pilots Licence (CPL) course, STAA uses Flight and Navigation Procedures Trainers (FNPT) which simulate the instruments and controls found on singleand multi-engine piston aircraft such as the Cessna 172 and Piper PA44 Seminole, which are single crew aircraft. As we are currently implementing a new Multi-Crew Pilot Licence (MPL) programme, in which pilots are taught to fly larger multi-crew aircraft, we are currently acquiring an A320 simulator.

How do you ensure optimal performance from the simulators?
Cheok: We ensure that the latest developments in civil aviation regulations, airports and so forth are updated in the database. The same applies to the opening of more air routes. This way, the pilots that are trained in the simulator are still kept abreast on the current situation on the ground through their training.

Quay: Every year, CAAS inspects and examine to ensure that the training devices are kept current and in pristine condition to deliver the best training possible.

What more do you think can be done to enhance simulator training?
Quay: There are currently limitations with the 180° degree screens in the simulators today. By widening the screens to offer a field of vision of 200 degrees, the experience within the simulator will be enhanced, bearing a greater resemblance to an actual cabin.

Cheok: Today, the air traffic component of the training has not yet been integrated into the simulator programmes. The current arrangement still sees the instructor playing the role of an air traffic controller, delivering instructions to the pilot trainee. This is not as ideal as it becomes considerably more difficult in real-life flight situations as pilots are exposed to a greater amount of chatter over the radio and the air traffic situation can be very heavy. Hence, the industry is eagerly anticipating a piece of enhancement that is now being discussed at ICAO – the computer-automated Air Traffic Control (ATC) system. An automated ATC system within the simulator mimicking a realistic level of air traffic which would be useful to train the pilot to orientate himself when his is not the only aircraft flying into a busy airport. The question is if that required level of technology available today is good enough.