BRIDGING SKIES

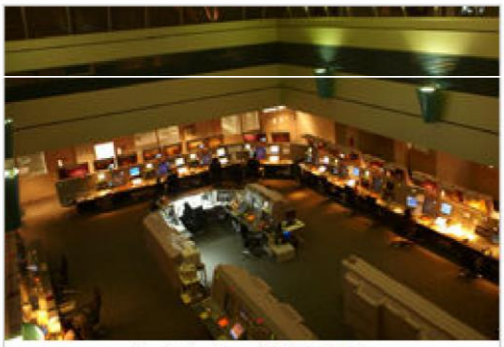
ISSUE 7

GUIDING VOICES

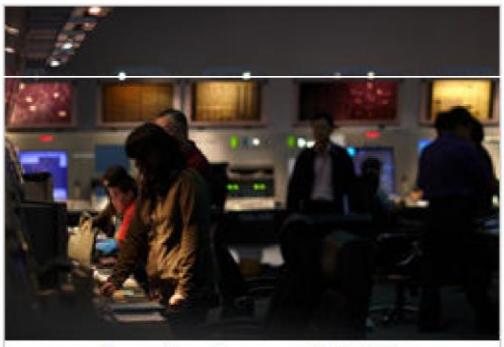
Unlike the Air Traffic Control Officers (ATCOs) stationed at the Changi Tower, the ATCOs at the Singapore Air Traffic Control Centre (SATCC) do not work on an elevated platform nor do they get the panoramic views of Changi Airport. Known as approach controllers and area controllers, they go about their tasks in a large, windowless operation room in SATCC which houses the Long Range Radar and Display System (LORADS) II air traffic control system. Find out more in this issue of Bridging Skies.

Nestled in remote Changi Village away from the busy airport, SATCC (pronounced Sat-See) is the base of operations where ATCOs keep an eye on aircraft that fly through Singapore's Flight Information Region (FIR) while they are still hundreds of miles from the runways. The Singapore FIR covers about 245,000 square nautical miles over the South China Sea and it is usually filled with dozens of aircraft flying through at a time.

Victor Tan, Chief of SATCC, Civil Aviation Authority of Singapore (CAAS), explained: "The tower controllers guide aircraft from eight nautical miles (NM) off the Changi Tower to touchdown as well as the aircraft in the manoeuvring area in the airport itself. The ones in SATCC guide the aircraft flying within Singapore's FIR."



Aerial view of SATCC.



Operational room at SATCC.

EQUIPPED TO WATCH THE SKY

An ATCO managing aircraft movement within his sector. He manages all the aircraft indicated in white on the screen.

As “eyes” on the sky, rows of high-tech equipment and radar terminals are set up at the heart of the operation room in SATCC to help ATCOs monitor aircraft and communicate with pilots flying within the FIR seamlessly and with immediacy. The radar terminals sport dark screens speckled with bright dots, each representing an aircraft with comprehensive status information such as its flight number, speed and height at which it is flying. There are two sets of radar – one is the approach surveillance radar for the approach ATCOs who guide aircraft closing in on the Changi Tower from a distance of 45 NM and nearer. The maximum range is about 120 NM and the speed of the radar’s rotation is about 15 rotations per minute (rpm) so ATCOs get an update on the information every four seconds. Tan explained that this means that controllers are able to get an accurate position of approaching aircraft even before they come within 45 NM of the tower. He added that the constant, speedy updates also enable ATCOs to spot quick changes in aircraft movements and react accordingly.

Another is the area surveillance radar for area ATCOs who guide aircraft flying at distances further than 45 NM up to the boundaries of the FIR. This radar covers as far as 250 NM and has a rotation of six rpm, which allows ATCOs to receive updated information every 10 seconds. The ability to track aircraft at such a distance allows SATCC to ensure the safe passage of aircraft passing through Singapore’s airspace.

“In a nutshell, our job is to provide aircraft with instructions to fly certain routes, descend or climb to certain heights safely and ensure that the aircraft are clear of one another before these steps are conducted,” explained Tan. He added that the ATCOs are also responsible for redirecting aircraft to return to Singapore or to other locations safely should they experience any problems or emergencies while still being airborne.

REACHING OUT THOUSANDS OF MILES

The equipment also includes state-of-the-art communication technologies to ensure that information is relayed with ease between the ATCOs and pilots as well as with ATCOs from other air navigation service providers (ANSPs). “The SATCC ATCOs do not need to change communication modes manually because, when the aircraft is in a certain range, communication will automatically switch from satellite to high frequency and very high

frequency or vice versa. The ATCOs can provide instructions to help aircrafts fly through or make a safe landing in Singapore smoothly and without interruption," said Tan.

The Software Keyboard Display (SOKD) allows the ATCO to input information and communicate with the computer system based on touch inputs.

Consoles and radar screens used by the ATCOs at SATCC.

UNINTERRUPTED SERVICE WITH SEAMLESS SUPPORT

The flight page indicates both aircraft that are within Singapore's FIR as well as future in-coming flights and departures.

The blue strips indicate westbound aircraft.

To ensure that aircraft continue to fly through Singapore's airspace safely even when emergency situations arise, cohesive interaction between the various sectors within SATCC and also between SATCC and other relevant organisations facilitate the effective backup systems and contingency arrangements already in place. In the unlikely event that the operations system is down, another row of terminals known as the Immediate Backup, will be used by ATCOs to manage the air traffic while the problem is being resolved. A power failure will not affect the entire system as each sector of equipment receives its power supply from different sources, which include generators and batteries. This ensures that operations at SATCC and management of air traffic goes on uninterrupted.

Such an efficient arrangement is also observed between SATCC and other organisations such as the National Environment Agency's (NEA) Meteorological (MET) Services, the Maritime and Port Authority of Singapore (MPA), the military and security agencies. The NEA's MET Services, for example, constantly updates ATCOs with weather forecasts of up to four hours and provides information from other meteorological services.

Aside from the weather, another potential obstacle that ATCOs and pilots must look out for are tall ships crossing the Straits of Johor, which could interrupt an otherwise smooth aircraft

landing or take-off. In this regard, there are equipment and crew stationed within the operations room dedicated specifically to avoid this. When the MPA is informed of vessels entering the Straits of Johor – the direction from which they are coming in, where the ships are heading and the size and height of these vessels – it relays the information to the ship crossing crew in SATCC. Buoys placed across the channel and a camera system zooming into the area enable the crew to confirm the location and size of these vessels. The data and recordings are then fed into the ship crossing system, where Flight Services Officers will process it and alert the ATCOs who are controlling the flights . Tan said that there is greater need for such services now that the vessels passing through the channel are much bigger and taller than before. He added that such ships, including barges, cranes, tankers and oil rigs, can go up to 180 metres high. “The main intent of this system is to verify the height of the vessel before it cuts across the aircraft’s glide path so that the vessel will not collide into an aircraft as the aircraft takes off or lands,” said Tan.

A Press To Talk (PTT) device is used when the controller needs to make a transmission on radio to an aircraft and the pilot.

Each buff or brown strip indicates an aircraft that is flying eastbound.

Area Air Traffic Control Officers (ATCOs).

ROUND-THE-CLOCK VIGILANCE

Victor Tan, Chief, SATCC

SATCC and its partners also display their vigilance and readiness to act through the Rescue Coordination Centre (RCC), which gets activated in an emergency. This includes situations when an aircraft crashes or when it encounters problems while still airborne and might crash. The ATCOs, who have been trained in search and rescue operations, will utilise the RCC meeting room to call up liaison officers from the relevant agencies such as the RSN, the RSAF, the Police Coast Guard and the Airport Emergency Service. Once the officers arrive, they plan and execute the appropriate search and rescue operation depending on the nature of the emergency. “As the RSN and the RSAF are involved, we have access to the best possible defence assets such as trained personnel and helicopters and ships to search for survivors and transport them to safety,” said Tan. The close collaboration among the various agencies enables SATCC to react efficiently to any aviation emergency, be it on sea or land.

The smooth communication between ATCOs and pilots, layers of backup available and cohesive coalition between departments and relevant players reveal that much effort is put into making ATC operations as smooth as possible. Tan believes that working together as a seamless chain of collaborating units will keep air traffic operations in Singapore’s airspace smooth and efficient. But more importantly, it ensures the safety of the aircraft and their passengers as they fly through or land and take-off from Singapore. He added: “At the end of the day, the safety of flights in the Singapore FIR is our top priority.”

A dual working position is adopted at SATCC, where one ATCO uses radar and the other uses strips for the planning of air traffic.

The Singapore Flight Information Region.