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Entering a New Aircraft Type into Service for a Singapore Air Operator

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In 1903, the Wright Brothers flew the first heavier-than-air flight at Kitty Hawk, achieving 12 seconds of flying time over a short distance shy of the length of a football field. Today, the longest Singapore Airlines commercial flight traverses around a third of the Earth's circumference, flying over 18 hours nonstop from Singapore to New York. As modern flight technology continues to break barriers unthinkable to the observers at Kitty Hawk, it begs the question: What goes into making sure that these flights are safe?

In October 2023, *The Leading Edge* published an article titled "Ensuring Airworthiness when Registering New Aircraft Types in Singapore." It detailed the Type Certificate (TC) acceptance process and the Civil Aviation Authority of Singapore (CAAS)' interactions with type design organisations to ensure that any aircraft type flying with a Singapore air operator meets all provisions of the Singapore Airworthiness Requirement Part 21. In addition to this TC acceptance, CAAS also oversees a parallel Entry-Into-Service (EIS)

process. Where the TC acceptance process primarily involves engagement with the aircraft manufacturer on the design and airworthiness of an aircraft type, the EIS process delves into an air operator's readiness to fly, maintain, and carry passengers with the new aircraft type. Together, these two processes help to ensure flight safety in the skies.

Singapore's Entry-Into-Service Process

Every Singapore air operator engaging in the carriage of commercial passengers or cargo must possess the Air Operator Certificate (AOC). The AOC certifies that an air operator is competent to conduct its business in accordance with Singapore's air navigation regulations. This article delves further into the EIS process that air operators must undergo when they apply to include a new aircraft type as part of a new AOC application or an application to vary an existing AOC.

For clarity, CAAS defines EIS as the processes and steps involved in preparing an air operator to begin operations with a new aircraft type or an existing aircraft with a new engine type. This should not be confused with other definitions adopted by some air operators, where EIS is performed whenever it received a new aircraft. CAAS' EIS process is thus only required for an air operator's first aircraft of the new aircraft type. The EIS process does not need to be repeated for subsequent aircraft of the same type operated by the same air operator.



CAAS inspectors approving an initial set of safety training instructors after intense validation sessions of the cabin training program for an EIS.

The Pre-Application and Formal Application Phases

CAAS would first convene a series of pre-application engagements with the applicant to discuss the scope of the EIS. Each project may differ in complexity, depending on whether the aircraft is or possesses:

- A new design never flown in Singapore
- A new type never flown by the applicant
- A variant of the same type flown by the applicant
- A different engine type than those flown by the applicant

The complexity of the EIS effort further depends upon the applicant's level of experience. For example, an existing AOC holder applying to add a new Airbus aircraft type to its existing fleet of Airbus aircraft, may benefit from a streamlined evaluation process given their established record, compared to a new AOC applicant with similar intentions. This is relevant as the complexity of an EIS determines the length of time required for the completion of the EIS process.

Pre-application discussions serve as the avenue for both CAAS and the applicant to understand the intended nature of operations and identify gaps in operational processes or regulatory oversight requirements. During the discussions, deliverables for a formal application to CAAS are discussed and clear and measurable goals are set for the completion of the EIS. Training needs for CAAS inspectors are identified to ensure that the required oversight capability is built. These pre-application discussions give both CAAS and the applicant an insight into whether the intended date for the start of commercial operations can be achieved.

The Evaluation and Validation Phases

Once the pre-application and formal application phases are completed, CAAS commences the intensive task of reviewing all applicant submissions. These include technical and operational items such as the aircraft flying and maintenance manuals, safety training programmes and procedures for the flight and cabin crew, maintenance task schedules for the new aircraft type,

evidence of compliance with safety and certification standards for the equipment fitted in the aircraft, and risk assessments for flight, cabin, ground, engineering, and airport operations.

A major part of the validation phase is the assessment of the operations specifications that would define the limits for which the applicant can operate the new aircraft type. This includes determining if the equipment onboard the aircraft are capable of meeting airspace standards such as the Reduced Vertical Separation Minima, or aerodrome standards such as for Low Visibility Operations. In certain cases, especially for new AOC applicants, CAAS may require a demonstration of the aircraft's capability to meet these standards. This may be done either through a proving flight in an actual aircraft, or a simulated flight in an approved flight simulator.

These are just a few of the multiple streams of activities that CAAS oversees in the process of preparing the airline, pilots and cabin crew, supporting services, and the larger industry before any new aircraft type begins operation. CAAS inspectors from several functional domains would therefore work alongside the applicant in areas such as:

- The qualification of flight simulators
- Design of specific training programmes for new equipment or destinations
- Review of hazards and risk assessments of new destinations
- Design of competency assessments for pilots and cabin crew
- Design and implementation of licensing tests for pilots to obtain a licence endorsement for the new aircraft type
- Endorsement of aircraft, flight, and technical training organisations to support competency development on the new aircraft type
- Design of specific training programmes for pilots and cabin crew in safety procedures
- Training and endorsement of engineering personnel for maintenance of the new aircraft type
- Endorsement of flying and technical instructors to conduct training for pilots, cabin crew and engineers
- Assessment of supporting aircraft maintenance organisations

Prior to the completion of the certification phase, CAAS inspectors must approve these activities as suitable for the applicant's intended EIS of the aircraft or engine type.



To support pilot training, CAAS inspectors qualify advanced simulators through a rigorous physical testing regime over several months.



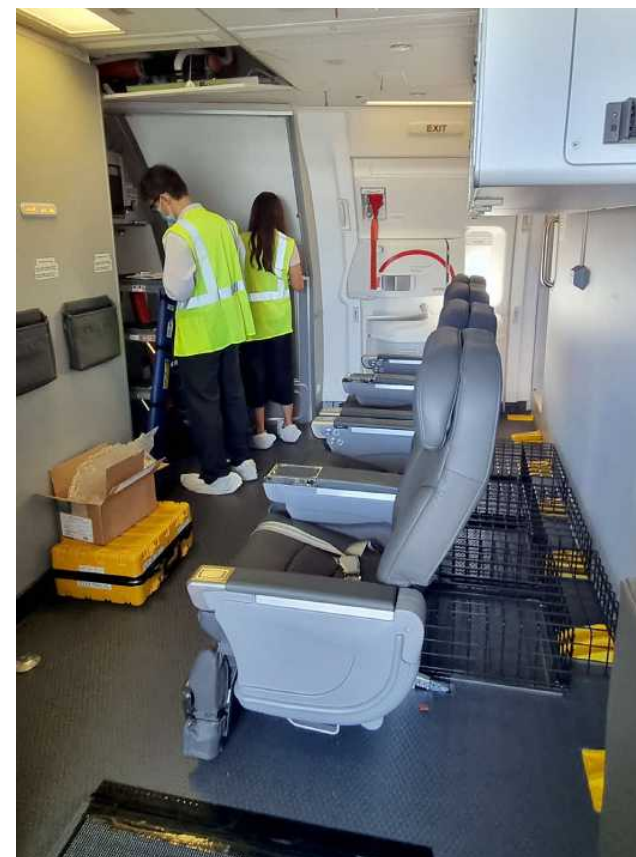
To validate new operations specifications such as new avionics equipment, CAAS inspectors may require applicants to conduct a demonstration in an approved simulator of the intended application of such equipment.

The Certification Phase

The EIS process ends with the issuance of three certification documents:

- The aircraft's Certificate of Airworthiness
- The aircraft's Certificate of Registration
- A new Air Operator Certificate, or a variation to an existing Air Operator Certificate

These documents symbolise that CAAS is satisfied that the applicant's operational and technical processes in place have met the prescribed safety standards and are in compliance with Singapore's safety regulations.



Before the issuance of certificates that mark the end of the EIS process, CAAS inspectors conduct validation checks on the aircraft to ensure that it complies with the required airworthiness standards.

Ensuring a Collaborative Safety Environment

The entire EIS process may take about six to 18 months from start to finish and involve collaboration between technical experts from CAAS, the applicant, and the aircraft or engine manufacturer. Though it may seem like a long and intensive process, both the TC acceptance and EIS processes are specially intended to be rigorous to assure the public that there are sufficiently robust policies and procedures to keep them safe whenever they fly with a Singapore air operator.



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Month	Course Dates	Course Title
May	6-9 May 2024	ICAO Standardised Training Package (STP): Operational Hazard Identification and Risk Mitigation
	14-16 May 2024	Safety Management System (SMS) Recurrent Training Course (jointly developed by CAAS and FAA)
	15 Jul-2 Aug 2024	ICAO Training Package: ICAO Government Safety Inspectors Personnel Licensing
July	1-19 Jul 2024	ICAO Training Package: ICAO Government Safety Inspectors Personnel Licensing
	8-12 Jul 2024	Safety Oversight Inspectors (Air Navigation Services)
	15-19 Jul 2024	State Safety Programme Implementation
	22-25 Jul 2024	ICAO Training Package: Training Managers Course
August	15 Jul-2 Aug 2024	ICAO Training Package: ICAO Government Safety Inspectors Airworthiness - Air Operator and Approved Maintenance Organisation Certification
	29 Jul -2 Aug 2024	Personnel Licensing for Regulators
September	2-6 Sep 2024	ICAO Training Package (ITP): Oversight of Competency Based Training
	30 Sep-4 Oct 2024	ICAO Training Package: Personnel Licensing (PEL) System
October	30 Sep-4 Oct 2024	ICAO Annex 14 Requirements and Application
	7-11 Oct 2024	Safety Oversight Inspectors (Aerodrome)
	7-11 Oct 2024	State Safety Programme Implementation
November	8-10 Oct 2024	Aerodrome Safety Operations [jointly organised with UK Civil Aviation Authority International (CAAi)]
	11-15 Nov 2024	ICAO Training Package: Oversight Aircraft Leasing Operations
August	12-16 Aug 2024	Resolution of Safety Issues
	19-30 Aug 2024	ICAO Standardised Training Package: IAASM-SAA Postgraduate Certificate in Aviation Medicine for Medical Examiners and Assessors