

Zero Time to First Officer



A training program for the multi-crew pilot license yields insights into global challenges.

BY WAYNE ROSENKRANS | FROM SEOUL

In the first year after the International Civil Aviation Organization (ICAO) introduced the multi-crew pilot license (MPL), the developmental test of an MPL training program in Brisbane, Australia, has made significant progress, including collecting data to validate its effectiveness, according to Marsha Bell, vice president, marketing, Alteon Training.¹

Airline industry advocates consider the MPL an essential step in modernizing pilot training that will further reduce operational risk as the global airline fleet doubles to more than 35,000 airplanes (Figure 1, p. 40) with 363,100 new pilots required to support this projected fleet growth and pilot retirements from 2006 to 2026, Bell told the joint meeting of the 60th annual International Air Safety Seminar, International Federation of Airworthiness 37th International Conference and International Air Transport Association (IATA) in October.

“There was an opportunity, in response to airlines’ request, for developing a better way to train pilots ... to serve their airline role

by incorporating airline operations [with] a competency-based metric of performance rather than an hours-based requirement,” Bell said. “The MPL is in essence an airline transport pilot license. It qualifies the holder, through a [limited] type rating endorsement for a specific commercial jet type ... to operate as a first officer. Broadly, the MPL is designed ... to have a greater emphasis on synthetic training devices, to incorporate airline operating procedures and airline disciplines around crew resource management [CRM] and threat-and-error management [TEM] in a multi-crew training environment.”

The license and its associated training requirements come from a comprehensive six-year development process involving specialists from airlines, pilot organizations, regulators and training organizations. During that time, ICAO member states and international organizations recognized safety challenges in some parts of the world, including substandard training infrastructure lacking pilot career paths comparable

China Eastern Airlines selected some of the first Alteon Training MPL cadets.

to the United States or Europe, inadequate measures of airline pilot competence, inconsistent use of competency-based training among states and training standards out of step with high-fidelity flight simulation and methods.

“In many respects, [the MPL] is being perceived as a new way of training pilots, the future of pilot training — but it is not without its challenges,” Bell said. “ICAO recognized that over the years, what had evolved in pilot training had splintered so that there wasn’t a global and harmonized

standard for pilots. The MPL was first motivated by ICAO’s desire to improve safety. So they looked at the old practices that had not been updated for over 40 years and evaluated new ways to develop pilot training ... by convening a large international group to serve on its Flight Crew Licensing and Training Panel. It was a global effort.”

The effort included a functional task analysis and risk assessment before full development of the MPL and a commitment by ICAO to follow up MPL introduction with proof-of-concept safety analysis for several years.

Misconceptions Persist

Gradual MPL adoption — such as its December 2006 addition to European Joint Aviation Requirements² and plans for regulatory changes that will enable MPL issuance in Australia by the end of 2007³ — and ongoing validation efforts have not dispelled misconceptions and concerns expressed by some within the aviation community. Bell said that the following beliefs are not supported by the facts: that the MPL is “rushing

to market,” that it is intended as a “cheaper and faster way to create a pilot,” that first officers with an MPL will not be ready for command because of their limited range of experience, and that MPL training is a “zero-time type program.”

Advocates argue that the MPL reflects years of research, deliberations, development and consensus-building among a large group of international specialists. The new approach to training airline pilots might save orientation time within airlines because of its operationally oriented training focus, enable more efficient scheduling of flight simulators and increase use of simulators rather than airplanes, Bell said. “The MPL is not a call to fix the problem that we see with a shortage of pilots in the industry — it is about better training for safer airline operations,” she said. For MPL training organizations, some costs actually will increase substantially because of instructor qualifications, requirements for several types of advanced flight training devices and simulators, and methods for initially training pilots as crewmembers rather than as individuals.

The time spent in MPL core flight training in an airplane is similar to the minimums in current conventional primary training, Bell said, and it includes mandatory upset recovery training. Types of flight experience will differ in that MPL holders are required to attain proficiency in airline methods of crew coordination and airline procedures on a commercial transport jet that conventionally trained first officers typically do not have, she said. “Is the graduate of the MPL program going into the right seat of a 737 as good as a 1,000-hour pilot who has flown a turboprop

The program in Brisbane includes a Diamond DA40 fixed-base flight simulation training device.



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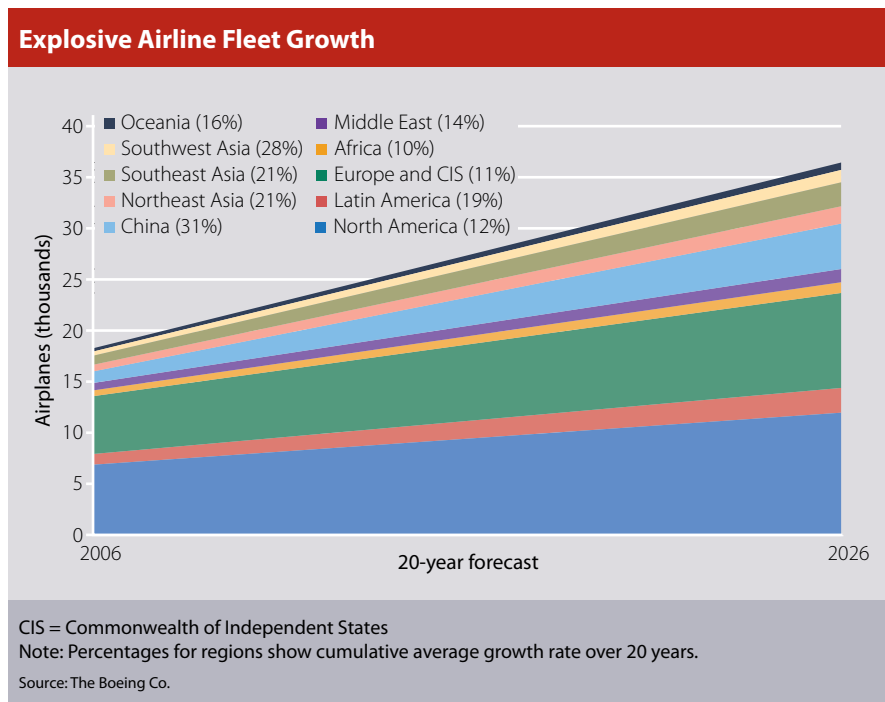


Figure 1

for night freight operations going to that same right seat?” she said. “I believe so.”

MPL Overview

After exhaustive analysis of the knowledge, skills and pilot operations required of first officers in large commercial jets, ICAO categorized them into nine broad competency units based on the work of the Flight Crew Licensing and Training Panel. Some states introducing the MPL will harmonize with ICAO requirements the details of their existing personnel licensing requirements. ICAO documents define and explain full details of the MPL requirements, including a first-class medical certificate, and the strict minimum training program for states to use as the basis for amending their aviation regulations.⁴ ICAO requires in part that during a minimum of 240 actual and simulated flight hours as pilot flying and pilot monitoring, the candidate complete specified solo, cross country and night operations with at least 70 flight hours in an airplane; upset

recovery training in an airplane; qualification for commercial jet operation under instrument flight rules; multi-crew certification; passing the state’s airline transport pilot written examination; and a restricted type rating to captain-level proficiency, typically including 12 takeoffs and landings as pilot flying in the type-rating airplane.

For its MPL training in Brisbane, Alteon Training overlaid the competency units on existing regulations of the Civil Aviation Safety Authority of Australia (CASA), generating 465 subcompetencies, Bell said. The General Administration of Civil Aviation of China also is monitoring the training of the cadets for the Australian MPL and amending its regulations to add the MPL.

Progress in Brisbane

The training program by Alteon Training, a subsidiary of The Boeing Co., has been conducted with 12 cadets, the company said. China Eastern Airlines and Xiamen Airlines helped to select the first

six, who began training in January 2007; the other cadets were selected by airlines in the Asia Pacific Region and began training in March 2007. As of mid-September 2007, each cadet had completed about 90 hours of flight as pilot flying, simultaneously accumulating about 120 hours of crew experience.

“ICAO calls for a very strict instructional systems design [for the MPL, and we] developed this training program in partnership with [Jeppesen] because their expertise was in instructional systems design as well as training materials development,” Bell said. “As we developed the training program and training materials, we shared them with the industry, sought [outside specialists’] feedback and used that to shape our training program, which is now in the validation stage. We made the promise that we would show them what we are doing and involve them along the steps [in] developing and implementing the training program.”

For the test, the MPL cadets completed the same commercial pilot ground school required of other Australian pilots in training because amendments to regulations had not been made for most of 2007. “So our cadets in the ... test have already [taken] the five commercial pilot written tests that are standard for [the Australian commercial pilot license],” Bell said. By the time that cadets complete the MPL training they also will have taken the airline transport pilot written test.

The tools and methods used in Brisbane differ from conventional training in several respects, including the focus on conducting flights as a crew, following airline procedures and documents, applying TEM to normal and abnormal operations, and extensive use of several advanced-technology flight training devices and simulators from the outset. Bell described a few of the characteristic activities.

“Each flight lesson starts with an orientation to the flight deck and provides opportunities for the cadets to ‘chair-fly’ that training while using their laptop computers or a desktop trainer,” Bell said. “They next have that same lesson take place in a fixed-base device ... with fully collimated daylight visual so that both pilots have the same frame of reference.” In each lesson, cadets rotate through the roles of pilot monitoring, pilot flying and pilot observing, with the last role functioning as a safety officer employing TEM during crew briefing and debriefing. A two-person crew then conducts the flight lesson in a Diamond DA40 single-engine airplane with the instructor and the pilot flying at the controls and the pilot monitoring performing duties typical for an airline first officer.

“Once the primary training is completed, they will move into the multi-engine [simulator] platform, and for our beta test that is going to be a Boeing 737NG because the cadets ultimately will return to their airlines and fly the 737NG,” Bell said. “Because it is fixed-base device, we can manage the workload, and gradually move from basic multi-engine operations into the full complexity of the 737NG cockpit. As we move into the type-rating portion of the program, we will move into the [737NG] full flight simulator.”

Before flight training lessons, the cadets review their airline’s flight operations manual, flight crew operations manual and scan-flow diagrams. “The cadets are learning, even in the DA40, the discipline and the method that they will employ when they are flying the line,” Bell said. Written assessments of knowledge, proficiency and TEM skills follow every lesson. Total hours for some stages of flight training in Brisbane appear similar to conventional *ab initio* training but are

conducted differently. “Our multi-engine [training] all takes place in a simulator, but it is about four times the number of hours in that environment than a pilot normally would have under traditional training methods,” Bell said. The MPL holder also will have experienced about 300 crew missions, compared with fewer than 50 crew missions in conventional programs, she said.

The test so far shows that the cadets habitually apply TEM and CRM skills in the airplane environment, that video debriefing systems in simulators and in the DA40 enhance crew self-critiques and help standardize instructor training delivery, and that materials have received “high marks” from visitors representing the stakeholder organizations, she said.

Policy Challenges

Near-term challenges for regulators, training organizations and airlines working to implement the MPL typically involve technical details — for example, modifying/approving airline indoctrination and initial operating experience — and augmenting resources, such as adding instructors qualified to conduct crew training at the primary level and multi-crew certification, airline operating procedures, and suitable airplanes and synthetic training devices equipped with “glass” instruments. States also implement MPL oversight by an industry advisory board.

ICAO’s proof-of-concept monitoring of de-identified data about the performance of each MPL holder will “help validate the training and [identify] where there might have been gaps in the training,” Bell said. The Flight Crew Licensing and Training Panel was disbanded in 2006, but IATA has assigned a task force to harmonize efforts in global implementation of the MPL, including “go team” technical consultations with

states, airlines, training organizations and pilot organizations, and an MPL instructor training and standardization guide. The initial focus of the task force has been the Asia Pacific Region, and the Association of Asia Pacific Airlines convened MPL symposiums during 2007.

While considering the MPL, Alteon Training found that the alternative conventional training to prepare an airline first officer in the Asia Pacific Region typically involves a two- to three-year training program, from the *ab initio* stage through flight training in as many as four different airplane models before pilots are introduced to the type-rating airplane. The Alteon Training MPL program in Brisbane comprises 308 training days. “Most countries might benefit from an MPL that replaces the training program they have now,” Bell said. ●

Notes

1. ICAO, which added the MPL to Annex 1, *Personnel Licensing*, effective Nov. 23, 2006, has characterized this change as the most comprehensive revision in airline pilot training since the annex first came into use in 1948.
2. EASA. Joint Aviation Requirements JAR-FCL 1, *Flight Crew Licensing (Aeroplane)*. Subpart K, “Multi-Crew Pilot Licence (Aeroplane)–MPL(A).” Dec. 1, 2006.
3. CASA. “Project FS 06/02, Multi-Crew Pilot Licensing (MPL).” <www.casa.gov.au/newrules/parts/061/fs0602.asp>. Pending completion of the new Civil Aviation Safety Regulations Part 61, *Flight Crew Licensing*. CASA has a project under way to provide regulatory cover (authorization) for the issuance of an MPL by amending 1988 Civil Aviation Regulations Part 5, *Qualifications of Flight Crew*.
4. ICAO documents that explain the MPL include Doc 9868, *Procedures for Air Navigation Services–Training*, first edition 2006, and the 10th edition of Annex 1, *Personnel Licensing*, published in July 2006.