International Civil Aviation Organization

WORKING PAPER

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ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 25: Other issues to be considered by the Technical Commission

SUPPORTING ENHANCEMENTS IN PILOT COMPETENCE THROUGH MODIFICATION TO ICAO COMPETENCY-BASED TRAINING AND ASSESSMENT (CBTA)

(Presented by the United States and co-sponsored by International Federation of Airline Pilots' Associations (IFALPA))

EXECUTIVE SUMMARY

ICAO competency-based training and assessment (CBTA) is a specific version of competency-based training introduced in the *Procedures for Air Navigation Services Training* (PANS-TRG, Doc 9868) in 2006. ICAO's set of current competencies was achieved through consensus across various industry groups using an approach that prescribes competence. Conceptually, CBTA has value; however, effective implementation of a CBTA training paradigm must include a validated competence framework, training and assessment methods, and inter-rater reliability for instructors and evaluators. To ensure that States maintain confidence in the recognition of other States' licences, clear and comprehensive guidance must be delivered so the regulators can ensure the training is effective and meets equivalent licensing requirements. The current ICAO CBTA guidance is not yet mature enough for this assurance. The ICAO CBTA's prescriptive approach confuses what is desired with what is observable. Attempts to map specific behaviours to socially constructed descriptions of competence create an unreliable approach and lead to an exhaustive list of 'observable behaviours'. In addition, the Automation Study Report produced by the Personnel Training and Licensing Panel (published as ICAO Circular 361) found concerns with how automated and manual flight are treated in training and operations. These findings have implications for the current definitions of some of the ICAO pilot competencies. Therefore, current CBTA pilot competencies need to be reconsidered. Potential improvements to CBTA should use scientific methods and instructional system design to develop competencies that can be validated in practice. Improvement should also ensure the developed competencies can be observed, trained, and empirically evaluated. Also, solutions must consider and incorporate the breadth of competencies so that instructors have a robust training program to ensure they are effective at training and assessing the competencies. Importantly, the programme throughout must include instructor standardization and inter-rater reliability. This working paper calls to strengthen the ICAO CBTA framework with the recommended improvements for pilot training and invites the Assembly to agree on an approach to accomplish the CBTA's intended outcomes for the benefit of both Member States and ICAO.

Action: The Assembly is invited to: a) request that ICAO revise Doc 9868, *Procedures for Air Navigation Services Training* (PANS-TRG), to provide comprehensive guidance that empowers independent implementation for effective training so that States can implement a standardized CBTA program for pilots; prior to amending Annex 1 — *Personnel Licensing*; b) request that ICAO create a robust inspector oversight mechanism and assure instructor standardization and inter-rater reliability within the ICAO CBTA methodology to promote harmonization and confidence among Member States; and c) recommend ICAO to emphasize the use of instructional system design (ISD) and leverage the expertise of behavioural and learning sciences to define proposed pilot competencies that are measurable and generate actionable data, including minimum data requirements, to validate the effectiveness and to improve CBTA.	
Strategic Goals:	This working paper relates to all Strategic Goals.
Financial implications:	ICAO panels will primarily clarify and harmonize PANS-TRG. Once clarifying CBTA guidance is implemented, States will incur associated costs which may include software upgrades, training of CBTA instructors, training for CAA inspector oversight, and selected training media.
References:	Doc 9868, *Procedures for Air Navigation Services — Training*

1. INTRODUCTION

1.1 There are concerns about the implementation of ICAO CBTA, which is described as an alternative pilot training methodology and was introduce in the 2006 version of PANS-TRG. ICAO surveys have indicated that CBTA has not been widely adopted and that stakeholders did not understand how to implement CBTA effectively.

1.2 In early 2023, ICAO initiated a survey of States titled *Implementation and Evolution of CBTA*. The results gave a mixed perspective about the proposed CBTA framework for safety-critical professionals generally and pilot training specifically. Responses indicated that few States are implementing CBTA, and those that are, the responses showed partial and inconsistent implementation. Of the 67 responses received from Member States, 52 per cent indicated that they had not implemented CBTA, and 15.5 per cent indicated that they had implemented less than 10 per cent of the CBTA framework from the PANS-TRG. Only 10 per cent of States indicated that they had implemented more than 50 per cent of the CBTA framework.

1.3 ICAO also surveyed service providers, air operator certificate holders, and/or approved training organizations during the same time. Listed below are among the top concerns and challenges expressed by respondents:

a) no data collection process to assess the effectiveness of the programme;

b) primary challenges associated with CBTA implementation are how to train the competencies, training programme evaluation, and instructor inter-rater reliability;

c) regulator adoption, inter-rater reliability, and instructor standardization; and

d) quality training data and assessment; data processing system requirements.

2. DISCUSSION

2.1 The survey responses indicated that competencies are primarily used for assessment with limited use for training. This suggests operators have implemented a hybrid model of conventional training and ICAO CBTA. The respondents also indicated that their programs had not been approved, instructors were not trained to deliver CBTA, and inter-rater reliability of instructors was not assured.

2.2 Without the full breadth of an ISD process, critical CBTA elements may be missed. The current ICAO CBTA as developed within the PANS-TRG does not make a clear connection between the identification of foundational knowledge, skills, and attitudes and the “adapted competency model.” In addition to impacting the curriculum development of a qualification program, this could result in gaps in mission operations or comprehensive roles and responsibilities We recommend that ICAO reconsiders the current guidance in the PANS-TRG to align more closely with ISD processes.

2.3 A recent informal survey among International Federation of Air Line Pilots' Associations (IFALPA) pilots and instructors mirrored concerns identified in the ICAO sponsored surveys. The lack of instructor standardization leads to differing grading both internal to airlines and fleets, as well as externally across the industry. This is the result of poor inter-rater reliability among instructors. Feedback from instructors also highlighted the excessive complexity of grading when required during the entire simulator training and assessment sessions. These concerns are not addressed within the CBTA in its version specified in the PANS-TRG.

2.4 In the 177th Session of the ICAO Council, the decision (C-DEC.10) was taken at the recommendation of Air Navigation Commission (ANC) AN-WP/8102, resulting in Amendment 167 to Annex 1. This amendment contained the acceptance of the multi-crew pilot licence (MPL). The ANC was provided with assurance of the safety and efficiency gains of the MPL through the risk and safety benefit report of Flight Crew Licensing and Training Panel (FCLTP/2), the identification of specific risk control measures and a post implementation proof of concept programme.

2.5 Unlike Amendment 167 to Annex 1 that contained the acceptance of the MPL, there are no similar data or assurances on the safety, effectiveness, or efficiency gains for the ICAO CBTA. There remains limited proof of concept, no comparative trials against conventional training, nor any data that demonstrates ICAO CBTA for pilot training is equivalent to or an improvement over conventional training. It would be beneficial if ICAO would generate similar assurances, with supporting data, as referenced for the MPL.

2.6 Some industry organizations have stated that ICAO CBTA is effective, however, there is insufficient data that demonstrates its effectiveness. These organizations are strong proponents of CBTA and promote the notion that, if implemented, changes could result in a reduction in training hours and increased use of flight simulation training devices. These industry organizations wield far reaching influence. Therefore, it is vital the cooperative policy of recusal from relevant panel matters must be in place to safeguard against potential conflicts of interest that may arise from participation in CBTA panels.

2.7 ICAO CBTA needs to be a data-driven training programme. There are two kinds of data collection needed. One is to inform training and the second is to assure training is operationally effective. Operational and safety data from operations should be used to develop training curricula and realistic scenarios that prepare pilots for the operational demands of the job. CBTA needs to include in its

framework processes by which data from operations are collected, analysed, and incorporated into training. Once pilots complete training and move into operations, there needs to be data collection processes for monitoring pilot performance to ensure training is effective. Therefore, it is recommended that the current hours in Annex 1 be maintained with the introduction of ICAO CBTA during the initial phase of training for a license, occurring in parallel with conventional training. Once sufficient data demonstrates CBTA effectiveness, then an additional training phase could be added and its effectiveness evaluated incrementally, over time.

2.8 It is essential that ICAO CBTA methodology be implemented in a way that regulators can ensure it meets existing regulatory requirements. Pilots are unique amongst the aviation disciplines in that they work in a worldwide operating environment across State boundaries. States must have confidence that the training and licensing requirements meet the operational needs.

3. CONCLUSION

3.1 Competency within the framework of ICAO CBTA should be measured by data, validated, and incorporate standardization supporting inter-rater reliability.

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