



WORKING PAPER

**SEVENTH WORLDWIDE AIR TRANSPORT CONFERENCE
(ATCONF/7)**

Montréal, HQ, 16 to 20 November 2026

Agenda Item 2: Fostering aviation growth and air connectivity through investments in infrastructure, human capital and partnerships

2.2: Investment for the development and modernization of civil aviation infrastructure

**STRENGTHENING AIR TRANSPORT HUMAN CAPITAL THROUGH COMPETENCY-BASED TRAINING AND STRATEGIC INDUSTRY PARTNERSHIP
A SECTORAL EXPERIENCE FROM GARUDA INDONESIA TRAINING CENTER (GITC)**

(Presented by Indonesia)

EXECUTIVE SUMMARY

Air connectivity in an archipelagic country relies not only on infrastructure, but also on competent aviation professionals and strong partnerships among regulators, airlines, training organizations, Original Equipment Manufacturers (OEMs), technology providers, and academia. This paper addresses workforce gaps and emerging competency needs by proposing collaborative, competency-based approaches to strengthen long-term aviation resilience and sustainable growth. Drawing on Garuda Indonesia Training Center (GITC)'s 2026 and forward portfolio, the paper presents a practical capability framework covering: (i) foundational airline programs through Basic Airline Operation Course (BAOC), Basic Airline Commercial Course (BACC) and Basic Aircraft Technical Knowledge (BATK); (ii) leadership development through Airline Management Development Program (AMADEP); (iii) Aircraft Maintenance Training Organization (AMTO) re-certification under Civil Aviation Safety Regulations (CASR) Part 147; (iv) Competency-Based Training and Assessment (CBTA) and Evidence-Based Training (EBT) for pilots and cabin crew, with future extension to maintenance and system design informed by the Federal Aviation Administration (FAA) Advanced Qualification Program (AQP) principles; (v) human factors and safety training through Crew Resource Management (CRM), Safety Management System (SMS) and Upset Prevention and Recovery Training (UPRT); and (vi) planned Environmental, Social, and Governance (ESG) and aviation sustainability training for 2027. The paper further proposes scalable partnerships for curriculum development, instructor and assessor capability, training technology, competency recognition, human factors, sustainability literacy, and continuous improvement. Investing in human capital therefore complements infrastructure development and helps build a safer, more resilient, connected, and sustainable air transport ecosystem.

Action: The conference is invited to:

- a) recognize aviation human-capital development and industry partnerships as strategic enablers of safe, resilient and sustainable air connectivity, particularly for geographically dispersed markets;
- b) encourage States and industry stakeholders to adopt competency- and evidence-based training and assessment, including CBTA and EBT where applicable, informed by the International Civil Aviation Organization (ICAO) provisions and international models such as FAA AQP and adapted to national regulatory frameworks; and

c) promote scalable partnership mechanisms for curriculum development, instructor and assessor capability, training technology, human factors, sustainability literacy and continuous improvement.	
<i>Strategic Goal:</i>	This working paper relates to Strategic Goal: <i>The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All.</i>
<i>Financial implications:</i>	N/A
<i>References:</i>	Doc 9683, <i>Human Factors Training Manual</i> Doc 9859, <i>Safety Management Manual (SMM)</i> Doc 9868, <i>Procedures for Air Navigation Services-Training</i> Doc 9995-1, <i>Manual of Evidence-based Training</i> Doc 10002, <i>Cabin Crew Safety Training Manual</i> Doc 10011, <i>Manual on Aeroplane Upset Prevention and Recovery Training</i> European Union Aviation Safety Agency (EASA), Part-147 maintenance training organisation framework and applicable acceptable means of compliance and guidance material (AMC/GM) Federal Aviation Administration (FAA), Advanced Qualification Program (AQP), AC 120-54A (Change 1); 14 CFR Part 121 Subpart Y Republic of Indonesia, Ministry of Transportation, CASR Part 147 / PM 84 Tahun 2017

1. INTRODUCTION

1.1 Indonesia is an archipelagic nation in which air transport connects geographically dispersed communities and economic centers. As demand evolves, the sector faces workforce shortages, skills gaps and emerging competency requirements across operational, technical, commercial and managerial functions. These conditions strengthen the case for structured, competency-based and continuously evolving human-capital development, supported by cooperation among regulators, airlines, training organizations, universities, Original Equipment Manufacturers (OEMs), technology providers and other stakeholders. Human capital should therefore be considered alongside physical and digital infrastructure as an essential component of aviation investment. Training centers can function as institutional platforms that connect foundational capability, leadership, regulatory readiness, competency assessment, human factors, safety, sustainability and partnerships. The Garuda Indonesia Training Center (GITC) experience provides a practical basis for scalable approaches adaptable to different aviation markets and workforce conditions.

2. DISCUSSION

2.1 **Current Human Capital Challenges.** Globally and regionally, aviation organizations face increasing difficulty in attracting and retaining qualified professionals, developing future leaders, expanding training capacity and maintaining competence as aircraft systems, procedures, digital technologies, safety requirements and sustainability expectations evolve. For Indonesia, geographic dispersion adds the need to sustain capability across distributed operations and to ensure access to qualified training and assessment. At the airline level, the principal challenges are: talent attraction and retention; future leadership; access to instructors, assessors, training devices and specialized expertise; maintenance of demonstrated competence rather than course completion alone; and integration of human factors, safety, digital and sustainability competencies. The implication is a shift from isolated training events to an integrated capability-development ecosystem.

2.2 From Training Provision to Capability Development. GITC's 2026 and forward portfolio is structured as a capability continuum linking foundational knowledge, leadership development, maintenance-training governance, competency-based assessment, human factors, safety and sustainability. The model emphasizes demonstrated operational competence and continuous development rather than training completion alone.

Training / capability	Capability focus	Human-capital objective	Partnership / regulatory dimension
BAOC / BACC / BATK	Airline operation; commercial & sales; maintenance & engineering	Baseline hardskill capability across core functions	Common training architecture and operational/technical alignment.
AMADEP	Leadership, airline business, people management, problem solving and quality	Prospective leaders with integrated hardskill + softskill capability	Cross-functional input from business units and senior leaders.
AMTO re-certification	Aircraft maintenance training	Strengthen maintenance-training capability under CASR Part 147	DGCA oversight and regulatory/quality assurance readiness.
CBTA + EBT	Pilots; cabin crew -> maintenance	Demonstrated competence, evidence-informed and scenario-based performance	ICAO CBTA/EBT; informed by FAA AQP principles; phased maintenance extension.
Human Factors & safety	CRM; SMS; Human Performance; UPRT	Crew coordination, safety awareness and human-performance resilience	Current CRM/SMS for pilots and cabin crew; UPRT as complementary capability.
ESG & sustainability	Environmental, social and governance; airline sustainability	Build workforce literacy for sustainability in decisions and operations	Planned 2027, aligned with aviation sustainability references.

2.2.1 The GITC experience indicates that workforce challenges require cooperation beyond individual airlines or training centers. A scalable model should facilitate joint competency development; shared training resources and expertise; development of qualified instructors, assessors and training professionals; competency- and evidence-based approaches linked to operational performance; continuous curriculum adaptation to human factors, safety, technology and sustainability; and regional knowledge-sharing where capacity is unevenly distributed.

2.3 Emerging Operational Competencies and Performance-Based Training. Aviation operations increasingly require personnel to apply technical knowledge effectively in complex operational environments. This places greater emphasis on human performance, safety, operational decision-making, evidence-based assessment and continuous competency development. GITC is progressively shifting from course completion towards demonstrated operational competence and measurable performance.

2.3.1 Competency-Based Training and Assessment. The GITC Competency-Based Training and Assessment (CBTA) pathway strengthens the connection between training, operational tasks and measurable performance. For pilots, Evidence-Based Training (EBT) will use relevant operational and training evidence to identify competency and risk priorities. System design is informed by the Federal Aviation Administration (FAA) Advanced Qualification Program (AQP) principles, including job-task analysis, proficiency-based objectives, scenario-based training and evaluation, Crew Resource Management (CRM) integration, instructor/evaluator standardization and data-driven quality control. The International Civil Aviation Organization (ICAO) Procedures for Air Navigation Services-Training (PANS-TRG) (Doc 9868) and the ICAO Manual of Evidence-based Training (Doc 9995) provide primary reference frameworks.

2.3.2 Human factors and safety as an integrated capability. GITC currently provides CRM and Safety Management System (SMS) training for pilots and cabin crew, strengthening human factors,

teamwork, communication, situational awareness and safety-management principles. Upset Prevention and Recovery Training (UPRT) complements this capability by supporting appropriate human performance in abnormal and unexpected situations. These competencies are positioned within the broader CBTA/EBT architecture rather than as standalone subjects.

2.3.3 Progressive extension and digital enablement. Following appropriate governance, instructor/assessor capability and regulatory foundations, the competency-based architecture can be extended to maintenance personnel in alignment with Civil Aviation Safety Regulations (CASR) Part 147 and applicable national approval requirements. Digitalization can support a continuous competency-management loop:

- learning content → training evidence → assessment results → operational evidence → competency records → recurrent training decision.

2.4 Industry Partnership Model. Sustainable human-capital development requires structured partnerships among regulators, airlines, OEMs and technology providers, training organizations, universities and, where relevant, Environmental, Social, and Governance (ESG) specialists. These partnerships can align regulatory requirements, operational needs, training outcomes and emerging competencies while expanding access to expertise and specialized resources.

Partner	Potential contribution	Expected system value
Regulator	Oversight, approval, standards and feedback	Regulatory confidence and safety assurance
Airline functions	Job-task requirements, operational data, SMEs and validation	Operational relevance and transfer of learning
OEM / technology partners	Aircraft/system knowledge, simulators, digital tools and specialized content	Current technical capability and faster technology adoption
Training / academic partners	Instructional design, assessment science, research and talent development	Scalability, innovation and talent pipeline

2.5 Replicability and Role of ICAO. The transferable lesson is not replication of a specific Garuda programme, but replication of a governance model: foundational skills, future-leader development, training-organization capability, CBTA/EBT and human factors, sustainability literacy and institutionalized partnerships. The model can be adapted to different workforce conditions, fleet mixes, infrastructure maturity and regulatory frameworks, including through regional cooperation where specialized capability is limited. ICAO can facilitate wider application through knowledge-sharing platforms, best-practice repositories, human-capital guidance and capacity-building initiatives, helping States and industry adapt competency-based, human factors and sustainability-oriented approaches to national and operational contexts.

3. CONCLUSION

3.1 Human Capital and Partnerships as Enablers of Aviation Connectivity. Aviation connectivity depends not only on physical and digital infrastructure, but also on competent, resilient and continuously developing personnel. Workforce shortages, evolving competency requirements and uneven training capacity require a shift from course-based training towards integrated, competency- and performance-focused human-capital development. The GITC sectoral experience shows how foundational training, leadership development, maintenance-training capability, CBTA/EBT, human factors and safety competencies, and sustainability literacy can be connected through structured partnerships. The value lies

in the governance model: converting training investment into operational capability that strengthens safety, resilience, connectivity and sustainable growth.

3.2 **Proposed Directions for States, Industry and ICAO:**

- a) integrate human-capital development into aviation investment planning alongside physical and digital infrastructure, with greater emphasis on competency-based, evidence-informed and continuously evaluated training;
- b) strengthen partnerships among Civil Aviation Authorities, airlines, training organizations, universities, Aircraft Maintenance Training Organizations (AMTOs), OEMs, technology providers and other relevant stakeholders to expand training capacity, expertise and access to specialized capabilities;
- c) support scalable and adaptable training ecosystems, including regional cooperation and knowledge-sharing mechanisms to address workforce, human factors and sustainability/ESG capability gaps, particularly where specialized resources are limited;
- d) promote continuous competency development and workforce mobility through appropriate competency frameworks, instructor and assessor development, training technology and, where applicable, mechanisms for mutual learning and recognition consistent with national regulatory frameworks; and
- e) leverage ICAO's role as a facilitator of international cooperation through knowledge-sharing platforms, best-practice repositories, human-capital development guidance and capacity-building initiatives.

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