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Agenda Item 4: Emerging technologies, new business models and other associated aspects
4.3: Leveraging air transport data and the digital ecosystem for seamless, secure and resilient operations

DRAFT REPORT

(10 pages)

Agenda Item 4: Emerging technologies, new business models and other associated aspects
4.3: Leveraging air transport data and the digital ecosystem for seamless, secure and resilient operations

4.3.1 DOCUMENTATION

Part A: Aviation Data for Economic Regulation and Development

4.3.1.1 In WP/9, the Secretariat highlighted the strategic role of trusted, secure and interoperable aviation data ecosystems in supporting evidence-based policymaking, economic regulation, risk-based oversight and operational resilience. The paper emphasized harmonized data standards, governance, advanced analytics and responsible use of artificial intelligence (AI), together with privacy safeguards and human oversight. The Conference was invited to recognize the role of aviation data and digital ecosystems, encourage alignment with ICAO guidance and global frameworks, promote integrated and risk-informed regulatory approaches, and support interoperable digital identity and passenger-data exchange frameworks consistent with ICAO provisions.

4.3.1.2 WP/153, presented by Chile and supported by 19 Member States of the Latin American Civil Aviation Commission (LACAC)[1], proposed modernization of ICAO's statistical data management systems. It highlighted the need to revise data-gathering methodologies, update reporting tools and communication channels, prioritize open-source software or open technological standards, and establish common standards for compatible, comparable and interchangeable data. The Conference was also invited to support a methodology enabling reporting countries or designated focal points to have free access to ICAO databases.

4.3.1.3 WP/125, presented by Kenya on behalf of the 54 Member States of the African Civil Aviation Commission (AFCAC)[2], emphasized reliable, harmonized and timely aviation data as the foundation for economic oversight, investment and monitoring the outcomes of liberalization. It described the African Programme on Aviation Data (APAD), including harmonized reporting instruments, common indicators and a regional platform under development. The Conference was invited to support common global indicators for connectivity, affordability, accessibility, traffic growth and liberalization outcomes, strengthen national statistical capacity, and enhance cooperation with AFCAC on standards, reporting and sustainable regional data mechanisms.

4.3.1.4 WP/43, presented by Malaysia, proposed a progressive transition from static, periodic economic regulation towards agile, evidence-based oversight supported by continuous market monitoring, shared analytics and structured peer benchmarking. It identified five principles: proportionality; interoperability; transparency with confidentiality safeguards; capacity before compliance; and continuous review, including indicator-triggered reviews supplementing scheduled reviews. The paper outlined a voluntary roadmap comprising self-assessment, a peer-learning network and subsequent guidance updates. The Conference was invited to endorse the principles, request updates to Doc 9587 and Doc 9626, and invite participation in an ICAO-coordinated voluntary peer-learning network.

[1] Argentina, Belize, Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of)

[2] Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

4.3.1.5 WP/17, presented by the Republic of Korea, proposed a common definition and classification framework for measuring the economic impact of the civil aviation industry. The paper highlighted the need for consistent industry boundaries when measuring direct, indirect and induced impacts under Assembly Resolution A42-26. It invited ICAO to consider an extended definition and common classification principles accommodating evolving aviation activities, linked to international statistical standards and the Aviation Satellite Account (ASA) methodological framework, while retaining flexibility for States to map their existing national classifications.

4.3.1.6 WP/77, presented by Saudi Arabia, proposed modernizing ICAO's economic policy guidance through data-driven methodologies and diversified economic tools, including the Global Aviation Competitiveness Index (GACI) and ASA. The paper emphasized demonstrating the economic returns of regulatory reform, accounting for regional disparities and market developments, and strengthening collaboration between the Air Transport Regulation Panel (ATRP) and the Aviation Data and Analysis Panel (ADAP). The Conference was invited to support more dynamic guidance, coordinated panel workflows, appropriate resources and tailored capacity-building packages.

4.3.1.7 WP/159, presented by Venezuela (Bolivarian Republic of) and supported by 19 LACAC Member States[3], highlighted data governance and continuous statistical analysis as structural enablers of economic planning, regulatory oversight, sustainability and operational continuity. The paper encouraged transition from fragmented analytical processes to integrated, cyber-secure and interoperable digital platforms. The Conference was invited to recognize these priorities and request ICAO to strengthen technical cooperation, assistance and specialized training for developing States in accordance with the *No Country Left Behind* Strategic Goal.

4.3.2 DISCUSSION

4.3.2.1 The Conference emphasized that reliable, timely and harmonized aviation data underpin economic regulation, investment, connectivity and risk-based safety and security oversight. The Conference also underlined that ICAO should build on existing tools, keep new data requirements proportionate, protect sensitive information and avoid unnecessary reporting burdens. It further stressed sound data governance, cross-agency interoperability and safeguards for responsible AI, including human oversight.

4.3.2.2 Broad support was expressed for modernizing ICAO statistical systems. It was emphasized that implementation should be phased, affordable and secure, with capacity-building for developing States. Support was expressed for access for reporting States or their focal points, and the importance of open access to data, including for independent research, was also underlined.

4.3.2.3 Support was expressed for the proposed data-driven oversight approach, provided that new data requirements remain proportionate, avoid duplication and deliver demonstrated benefits. Some delegations stressed that work on guidance updates should be led by Member State experts in the relevant panel. It was also noted that this work could inform any update of Docs 9587 and 9626 on a voluntary, non-binding basis, taking account of national circumstances.

4.3.2.4 Support was expressed on common indicators for connectivity, affordability, accessibility, traffic growth and liberalization outcomes, drawing on existing regional experience. Some delegations expressed reservations about uniform global benchmarks, stressing that indicators should primarily help States assess progress against their own national objectives and allow flexibility within existing frameworks.

[3] Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, and Uruguay

Support was also expressed on a common classification providing flexibility for national systems and a clear distinction between classification and economic impact measurement.

4.3.2.5 The Conference supported closer coordination between the ATRP and ADAP. It was stressed that the ATRP should prioritize its existing work, and that the proposed coordination should be pursued within the panels' existing schedules and entail no additional tasking. Support was expressed for using this coordination to modernize economic guidance. The signing of the Aviation Satellite Account Methodological Framework was also welcomed.

4.3.2.6 Support was expressed for technical assistance and training to strengthen data management and analytical capacity. Delegations highlighted the need for financing, skills, infrastructure and institutional support in developing States, especially least developed and landlocked developing countries. The effects of data gaps on investment and risk assessments were highlighted. Attention was also drawn to cybersecurity, non-discriminatory access to technology and the need to avoid unjustified reporting burdens.

4.3.2.7 The Conference noted information papers WP/107 presented by Colombia supported by 17 LACAC Member States[4], WP/165 presented by Colombia and supported by 16 LACAC Member States[5], WP/178 Revision No. 1 presented by Italy, and WP/148 and WP/187 presented by Kazakhstan.

4.3.3 CONCLUSION

4.3.3.1 As a result of the documentation considered and ensuing discussion under Agenda Item 4.3 Part A, the Conference concluded that:

a) reliable, timely and harmonized aviation data, supported by interoperable and secure digital systems, are essential for evidence-based policymaking, economic regulation, investment planning and the sustainable development of air transport;

b) ICAO should continue modernizing its statistical data collection and reporting tools, promote common data standards and indicators, and improve the comparability and accessibility of aviation data, taking into account the needs and capabilities of Member States;

c) ICAO, through its relevant panels and existing mechanisms, should continue strengthening economic data and analytical tools, including the Aviation Satellite Account (ASA) and Global Aviation Competitiveness Index (GACI), to support evidence-based policymaking, assess the economic contribution and competitiveness of air transport, and inform the modernization of economic regulatory frameworks; and

d) ICAO should promote cooperation with States and regional organizations, and support technical assistance, training and the sharing of good practices to strengthen national and regional data management and analytical capacity, particularly in developing States.

[4] Argentina, Belize, Bolivia (Plurinational State of), Chile, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru and Uruguay

[5] Belize, Bolivia (Plurinational State of), Chile, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru and Uruguay

4.3.4 RECOMMENDATION

Recommendation 4/x — Aviation data for economic regulation and development

The Conference recommends that:

a) States should strengthen national aviation statistical and data-management arrangements, including coordination among relevant authorities and industry stakeholders, timely reporting to ICAO, data validation and the use of reliable evidence in economic regulation and investment planning;

b) ICAO should continue modernizing its statistical data collection and reporting systems, promote common data standards, compatible formats and metadata, and improve the comparability, accessibility and usability of aviation data, taking account of confidentiality, available resources and the capabilities of Member States;

c) ICAO should, through its relevant bodies, consider developing and refining common indicators for connectivity, affordability, accessibility, traffic growth and liberalization outcomes, drawing on regional experience and existing reporting frameworks;

d) ICAO should examine a common definition, scope and classification framework for the civil aviation industry, linked to internationally accepted statistical standards, economic impact measurement under Assembly Resolution A42-26 and the ASA methodological framework, while allowing flexibility in national application;

e) ICAO should, through its relevant panels and existing mechanisms, continue strengthening economic analytical tools, including ASA and GACI, and coordination between ATRP and ADAP, within their existing work programmes and without additional tasking, to support evidence-based modernization of economic policy guidance;

f) ICAO should through its relevant panels and with the involvement of Member State experts, examine the principles of agile, data-driven economic oversight, including proportionate data requirements, interoperability, transparency with confidentiality safeguards, capacity-building and continuous review, and the scope for voluntary self-assessment and peer learning, which could inform possible future updates of Doc 9587 and Doc 9626; and

g) ICAO should strengthen cooperation with regional organizations and support technical assistance, training, knowledge sharing and sustainable regional data mechanisms to improve data management, reporting and analytical capacity, particularly in developing States.

4.3.5 DOCUMENTATION

Part B: Digital Transformation and AI governance

4.3.5.1 WP/81, presented by Brazil and supported by 17 LACAC Member States[6], described a policy framework for a seamless, secure and resilient biometric air travel ecosystem. The paper addressed fragmentation arising from operator-specific systems and redundant biometric enrolment databases. It outlined a State-coordinated, integrated and federated model in which identities are validated against authoritative government sources, supported by governance and personal-data protection. It invited recognition of coordinated biometric frameworks and exchange of experience to support trusted and interoperable implementation.

4.3.5.2 WP/83, presented by Brazil and the Civil Air Navigation Services Organisation (CANSO), and supported by 20 LACAC Member States[7], highlighted digitalization as an enabler of connectivity, efficiency and resilience. Drawing on Brazil's experience with digital aeronautical networks, data-link communications, automation and System-wide Information Management, it emphasized interoperable information services, cybersecurity, governance, digital trust and institutional capacity. The Conference was invited to support coordinated ICAO guidance and implementation mechanisms for secure, technology-neutral and inclusive digital transformation.

4.3.5.3 WP/26, presented by China, described its "Linking the Trunk and Branch, Connecting Urban and Remote" (LTB) model for digital and intelligent domestic transfer services. The paper highlighted government-enabled services, industry-led innovation, shared information platforms and cooperation among airports and carriers to improve transfer connectivity and passenger convenience. It invited States to coordinate digital infrastructure and data interoperability for transfer services and proposed that ICAO develop guidance and standards, publish good practices and organize exchanges, including through a proposed panel on transfer services.

4.3.5.4 WP/36, presented by China, described how Airport Collaborative Decision-Making (A-CDM) improves the conversion of planned, declared or scheduled airport capacity into actual operational throughput. The paper highlighted integration with air traffic flow management, improved milestone data and prediction, coordinated pushback sequencing, stand allocation, de-icing and disruption recovery. It clarified that these gains do not directly change runway geometry, stand numbers or regulatory separation minima. The Conference was invited to note China's experience and request relevant ICAO panels to study the feasibility of a global framework for safe, secure and accountable integration of AI across the aviation ecosystem.

4.3.5.5 WP/179, presented by Kenya on behalf of the 54 AFCAC Member States[8], highlighted the opportunities offered by digital transformation and AI alongside gaps in infrastructure, cybersecurity, specialized skills, data protection and governance. The Conference was invited to support inclusive, affordable and interoperable digital transformation, technology-neutral guidance, responsible AI use,

[6] Belize, Bolivia (Plurinational State of), Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Uruguay and Venezuela (Bolivarian Republic of)

[7] Argentina, Belize, Bolivia (Plurinational State of), Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of)

[8] Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

regional shared platforms, cybersecurity cooperation, capacity-building, technology transfer and appropriate financing, including cooperation with AFCAC and development partners.

4.3.5.6 WP/15, presented by Oman on behalf of the Arab Civil Aviation Organization (ACAO), proposed an ICAO-led global digital framework linking air transport agreements with operating permit systems. The proposed platform would hold agreement provisions and use AI to check permit applications against traffic rights, capacity, frequencies and operating conditions, referring applications outside agreement parameters to competent State authorities. The paper emphasized State sovereignty, human oversight, cybersecurity and data protection. The Conference was invited to support common technical and regulatory guidance, progressive participation, an international working group, capacity-building and consideration of a pilot project, while preserving States' authority over final decisions.

4.3.5.7 WP/20, presented by the Republic of Korea, addressed the conditions under which national AI laws and regulations apply to international aviation. It distinguished general AI laws administered by ministries responsible for AI from requirements applied through aviation regulatory frameworks under civil aviation authorities. The paper highlighted possible duplication, legal uncertainty, differing implementation dates and uncertainty over recognition of requirements already satisfied. The Conference was invited to recommend ICAO-led high-level discussions on common considerations, voluntary provision by States of information on applicable laws, competent authorities and inter-authority consultation, and compilation by ICAO Regional Offices of common regional issues and priorities.

4.3.6 DISCUSSION

4.3.6.1 The Conference supported and highlighted secure, standards-based and technology-neutral digitalization for connectivity, efficiency and resilience. The importance of System-wide Information Management as a key enabler of the transition to trusted, interoperable information services was highlighted, as was the need for phased implementation, including through FF-ICE, driven by operational needs and measured against tangible results.

4.3.6.2 Many delegations supported coordinated biometric identity systems with safeguards for personal data and measures to avoid fragmentation. Experience with biometric passenger processing, digital civil aviation regulatory services and digital security oversight were also shared.

4.3.6.3 Delegations welcomed the transfer-service experience and stressed that any future work should remain flexible and non-prescriptive, reflecting different operational realities and national capabilities. Several delegations favoured exchanging good practices through existing ICAO structures rather than creating a new panel and some did not support developing global standards for domestic interlining and baggage agreements.

4.3.6.4 Several delegations raised concerns regarding the establishment of a global platform given available resources, costs and past experience While others called for further assessment of technical feasibility and legal and financial implications before any implementation commitments. Support was also expressed with the emphasis that the work on establishing a global platform should proceed carefully and within available resources.

4.3.6.5 Broad support was expressed for high-level discussions on how national AI laws apply to international aviation. Views differed on a global AI governance framework. Some considered such a framework premature and favoured flexible approaches led by national authorities, while others supported a globally coordinated approach. There was broad recognition of the need for further evidence and discussion, including through the 2027 events, and for proportionate, risk-based and aviation-specific work.

4.3.6.6 Regarding digital transformation and AI alongside gaps in infrastructure, cybersecurity, specialized skills, data protection and governance, delegations emphasized phased, affordable implementation reflecting differing levels of digital readiness, with technical assistance, training, technology transfer and regional cooperation. The importance of inspector training, data governance, cybersecurity, data protection, information sharing and skills transfer was also highlighted.

4.3.6.7 The Conference noted the following information papers: WP/176 presented by El Salvador and supported by 17 LACAC Member States[9], WP/200, WP/201 and WP/202 presented by India, WP/188 presented by Kazakhstan, WP/193 presented by the United Arab Emirates, WP/22, presented by the International Air Transport Association (IATA), and WP/142 presented by the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and the International Business Aviation Council (IBAC).

4.3.7 CONCLUSION

4.3.7.1 As a result of the documentation considered and ensuing discussion under Agenda Item 4.3 Part B, the Conference concluded that:

a) digital transformation, including interoperable information systems, digital identity and responsible use of artificial intelligence, can enhance air transport connectivity, operational efficiency, facilitation and resilience;

b) States should be encouraged to pursue secure, interoperable and technology-neutral digital solutions, with appropriate data governance, cybersecurity, privacy protection and institutional arrangements, taking into account differing levels of digital readiness;

c) ICAO, through its relevant bodies and in coordination with existing work, should examine the need for harmonized, risk-based guidance on the use of artificial intelligence in aviation, including common terminology and consideration of differences among national regulatory approaches;

d) ICAO should facilitate the exchange of experience and good practices in digitalized airport and transfer services, biometric identity and digital regulatory processes, and assess where further guidance could enhance interoperability and reduce unnecessary administrative burdens; and

e) ICAO should support progressive implementation of digital transformation through cooperation with regional organizations and industry, technical assistance, capacity-building and knowledge sharing, particularly to assist developing States and avoid widening the digital divide.

[9] Belize, Bolivia (Plurinational State of), Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela

4.3.8 RECOMMENDATION

Recommendation 4/x — Digital transformation and AI governance

The Conference recommends that:

a) States should pursue coordinated, secure, interoperable and technology-neutral digital transformation initiatives aligned with relevant ICAO provisions and guidance, supported by appropriate governance, cybersecurity, protection of personal and sensitive data, and institutional capacity;

b) States should promote interoperable digital identity and passenger-data exchange frameworks consistent with ICAO Standards and Recommended Practices and guidance, including relevant Traveller Identification Programme and Digital Travel Credential work, to facilitate seamless travel and strengthen security;

c) ICAO should in coordination with existing work, examine the need for harmonized, risk-based guidance on the use of AI in aviation, including common terminology and meaningful human oversight, and facilitate high-level discussions on common considerations for the application of national AI laws and regulations to international aviation, informed by voluntary State submissions on applicable laws, competent authorities and inter-authority consultation, with ICAO Regional Offices compiling common regional issues and priorities, and on the outcomes of the 2027 events on AI in aviation to identify gaps, overlaps and inconsistencies;

d) ICAO should facilitate the exchange of experience and good practices in digitalized airport and transfer services, including A-CDM, biometric identity and digital regulatory processes, and assess where guidance could enhance interoperability, improve the use of existing capacity and reduce administrative burdens; and

e) ICAO should support progressive implementation through cooperation with States, regional organizations, industry and development partners, including technical assistance, capacity-building, knowledge sharing and technology transfer, particularly to assist developing States and avoid widening the digital divide.

— END —