



14TH STATISTICS PANEL (STAP/14) WORKING GROUP (WG) 1: NEW ICAO AIRCRAFT MOVEMENT DATABASE

REPORT

This Report, prepared by the WG1 rapporteurs, outlining the proposed course of action for the ICAO Statistics Programme to collect aircraft movement data from States for analyses of air navigation operations other than those related to aviation environmental protection in order to avoid duplication of efforts. It will be circulated to all panel members for comments. The Secretariat will take this report into account when drafting a STA/10 Working Paper (to be finalized in draft form by 9 October 2009) for the Tenth Session of the Statistics Division (STA/10) to be held from 23 to 27 November 2009 at ICAO Headquarters.

1. MANDATE

1.1 As prescribed by the **ICAO BUSINESS PLAN 2008-2010**, Vs. 5, ICAO is committed under its Strategic Objectives Safety¹ to enhance global civil aviation safety through, *inter alia*, enhancing the resolution of safety issues by ICAO through implementation of a safety management process, performance monitoring and assessment of existing and emerging safety risks. It is committed under its Strategic Objectives Efficiency², *inter alia*, to foster operational services in support of a performance-based air navigation system (PBANS). In that regard, the Statistics Programme is asked to develop analytical tools and perform data analyses on the basis of the proposed new ICAO aircraft movement database.

1.2 Against this background, the STAP/14, under Agenda Item 4 (STAP/14-WP10), acknowledged ICAO's needs to have aircraft movement data available for analyses, other than those related to aviation environmental protection to avoid duplication of efforts. It established the STAP/14 Working Group (WG1), comprised of members from Brazil, Egypt, India, United States and EUROCONTROL and the ICAO Secretariat, to propose a course of action for one consolidated ICAO aircraft movement database³.

2. MEMBERSHIP

2.1 Members as of 9 June 2009:

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2.2 It has been proven useful that the membership can be adjusted to WG1 needs in that alternates and additional members can be nominated to cover the expertise needed.

3. 2010 UPDATE OF CAEP COD

3.1 With the overriding goal of avoiding duplication of effort, it has been concluded to pool resources and update the existing Common Operations Database (COD) of ICAO's Committee on Aviation Environmental Protection (CAEP).

3.2 The ICAO Statistics Programme needs to be mandated with the FIR/UIR data collection for 2010 based on the STAP/14 conclusion which will hopefully be endorsed by STA/10. It needs to work out a protocol to collect the aircraft movement data from air navigation service providers (ANSPs) with the active support of States. For the latter, RECOMMENDATION STAP/14-11, namely to endorse the creation of a focal point for civil aviation statistics in the national civil aviation authorities, who should report data and improve reporting coverage, should be considered.

3.2.1 The identification and definition of data fields will be a simplified version of the CAEP COD which is shown in the Attachment. The problem of not homogeneous data origin, namely actual operations/radar data or filed flight plan data will have to be addressed.

3.3 The synchronization of national/sub-regional data requires can only be tackled by COD experts of the Modeling and Databases Task Force (MODTF) of ICAO CAEP, benefitting from their vast experiences in building the COD as one harmonized aircraft movement database on the basis of 2006 databases and resources supplied by both the United States' Department of Transport/Federal Aviation Administration (DOT/FAA) and EUROCONTROL.

3.4 The COD is currently limited for use to support CAEP activities only. A revision of the legal agreement between the U.S. DOT/FAA and EUROCONTROL is required to alter this provision. An agreement will have to be forged that the COD updated with 2010 data will be made accessible to the ICAO Statistics Programme and CAEP for their respective mandated analyses.

4. NEED FOR ECONOMIC ANALYSES SUPPORTING PERFORMANCE -BASED NAVIGATION IMPLEMENTATION

4.1 The International Civil Aviation Organization (ICAO) is committed, inter alia, to enhance civil aviation safety and operational efficiency worldwide. Towards these objectives, the Organization is instituting the concept of Performance-Based Navigation (PBN), which will enable the optimization of air traffic management (ATM) in terms of air routes and flight paths prescribed versus those actually flown, resulting enhanced safety of operations and improved air space capacity.

4.2 Indeed, air traffic growth, combined with conventional air route configurations established by ground-based, sensor-driven navigation aids (VOR, DME, NDB), have led to dangerously congested terminal areas and respective surroundings at many of the world's largest airports serving metropolitan centres. Aircraft operators face potential safety risks, delays and high operational costs as long as air navigation services providers (ANSPs) have to handle growing traffic understaffed with insufficient navigation system infrastructure, both in the terminal areas (TMA) and en-route.

4.3 Sensor-based air navigation has significant distinctions from PBN. The former has prescribed, fixed routes joining ground-based navigation aids often in an inefficient zig zag resulting in inefficient flight paths. Flying on these routes is not only more costly but also less accurate when compared to the Area Navigation (RNAV)/Required Navigation Performance (RNP) procedures, the basis of the PBN concept. Within given air traffic control (ATC) parameters, RNAV allows an aircraft to operate on a desirable flight path and therewith fly on more direct routes independently of the location of ground-based navigation aids. RNP is RNAV with the additional component of monitored performance and additional avionics equipment of flight capacity alert.

4.4 Following the partial or full implementation of reduced vertical separation minimum (RVSM) in all ICAO regions, further ATM optimisation depends now on the capabilities of a significant portion of airspace users in ICAO regions to utilize RNAV/RNP procedures that should be implemented in TMAs of major international airports until 2010.

4.5 The completion of safety assessments for various air space categories are envisaged in the pre- and post of PBN implementation phases and are conceptualized short term (2008 – 2012) and medium term (2013 – 2016) in the different ICAO regions. In addition, efficiency assessments are recommended in order to check on those implementation targets that translate directly into economic benefits. One of the key aspects of the PBN concept is the development of measurable performance objectives with their associated metrics in terms of reduced flight distances and, consequently, durations. A basic prerequisite for a successful PBN implementation is effective performance management that starts with the ability to reach a consensus on desired/required and achievable results or measurable and quantifiable performance indicators with the stakeholders concerned.

4.6 Potential applications of the updated CAEP MODTF COD by the ICAO Statistics Programme is to develop the analytical tools to measure the operational efficiencies of PBN implementation in order to monitor if the PBN initiatives have reached their targeted benefits, such as:

a) increased airspace safety through the implementation of continuous and stabilized descent procedures using vertical guidance;

b) enabling the use of the RNAV and/or RNP capabilities that already exist in a significant percentage of the aircraft fleet flying in each regional airspace; and

c) implementation of more precise approach, departure, and arrival paths that will reduce dispersion and will foster smoother traffic flows.

ATTACHMENT

A — CAEP MODTF COD - Identification and definition of data fields

**ICAO COMMITTEE ON AVIATION ENVIRONMENTAL PROTECTION (CAEP)
MODELING AND DATABASES TASK FORCE (MDTF)
COMMON OPERATIONS DATABASE (COD)**

IDENTIFICATION AND DEFINITION OF DATA FIELDS

FLIGHT_ID – unique flight identifier.

SOURCES – data sources for flight information (E = ETMS, F = ETFMS, O = OAG).

DEP_APT_ID – AEDT Airport database unique identifier for departure airport.

DEP_APT_CODE – departure airport code. This is an ICAO code wherever possible.

ARR_APT_ID - AEDT Airport database unique identifier for departure airport.

ARR_APT_CODE – arrival airport code. This is an ICAO code wherever possible.

DEP_DATETIME – departure date and time. Date format is month/day/year. Time is UTC time (not local time).

ARR_DATETIME - arrival date and time. Date format is month/day/year. Time is UTC time (not local time).

CARRIER_CODE – three letter carrier code where known, otherwise NULL.

FLIGHT_NUM – flight number where known, otherwise NULL.

TAIL_NUM – tail number where known, otherwise NULL.

ACTYPE – aircraft type. This value is source dependent. For example an OAG only source will have a 747-400 listed as a 744 (IATA CODE) while a ETMS only source will have it listed as a B744 (ICAO code).

ACCODE – AEDT Normalized aircraft code. Continuing the example from above all 747-400s, regardless of their source, will be listed as B747-4.

ENG_CODE – Engine code.

ENG_MOD – Engine modification, otherwise NULL.

OP_EMPTY_WGHT – Operating Empty Weight if known, otherwise 0.

MAX_PAYLOAD – Max payload if known, otherwise 0.

SERVICE_TYPE – Service type. P = passenger, C = cargo.

SEATS – total seat count.

SEAT_CLASS_ID – seat class id.

TAXI_OUT_TIME – taxi out time in minutes. This value is an actual time, an airport average, or a standard time in mode.

TAXI_IN_TIME - taxi in time in minutes. This value is an actual time, an airport average, or a standard time in mode.

CRUISE_ALTITUDE – randomly assigned cruise altitude in hundreds of feet.

¹ ICAO Business Plan 2008-2010, Vs. 5

Strategic Objective A: Safety

Enhance global civil aviation safety through the following measures:

- 1) Identify and monitor existing types of safety risks to civil aviation and develop and implement an effective and relevant global response to emerging risks.
- 2) Ensure the timely implementation of ICAO provisions by continuously monitoring the progress toward compliance by States.
- 3) Conduct aviation safety oversight audits to identify deficiencies and encourage their resolution by States.
- 4) Develop global remedial plans that target the root causes of deficiencies.
- 5) Assist States to resolve deficiencies through regional remedial plans and the establishment of safety oversight organizations at the regional or sub regional level.
- 6) Encourage the exchange of information between States to promote mutual confidence in the level of aviation safety between States and accelerate the improvement of safety oversight.
- 7) Promote the timely resolution of safety critical items identified by regional Planning and Implementation Groups (PIRGs).
- 8) Support the implementation of safety management systems across all safety related disciplines in all States.
- 9) Assist States to improve safety through technical cooperation programmes and by making critical needs known to donors and financial organizations.

² **Strategic Objective D: Efficiency**

Enhance the efficiency of aviation operations by addressing issues that limit the efficient development of global civil aviation through the following measures:

- 1) Develop, coordinate and implement air navigation plans that reduce operational unit costs, facilitate increased traffic (including persons and goods), and optimize the use of existing and emerging technologies.
- 2) Study trends, co-ordinate planning and develop guidance for States that supports the sustainable development of international civil aviation.
- 3) Develop guidance, facilitate and assist States in the process of liberalizing the economic regulation of international air transport, with appropriate safeguards.
- 4) Assist States to improve efficiency of aviation operations through technical cooperation programmes.

³ The Report of STAP/14 stipulates, under Agenda Item 11: Future Work, that the Panel Secretary presented additional tasks for the Statistics Programme according to the immediate action items of the conclusions reached by the Panel. The Tenth Session of the Statistics Division (STA/10) in November 2009 will need be informed of the progress made in the accomplishment of these tasks.