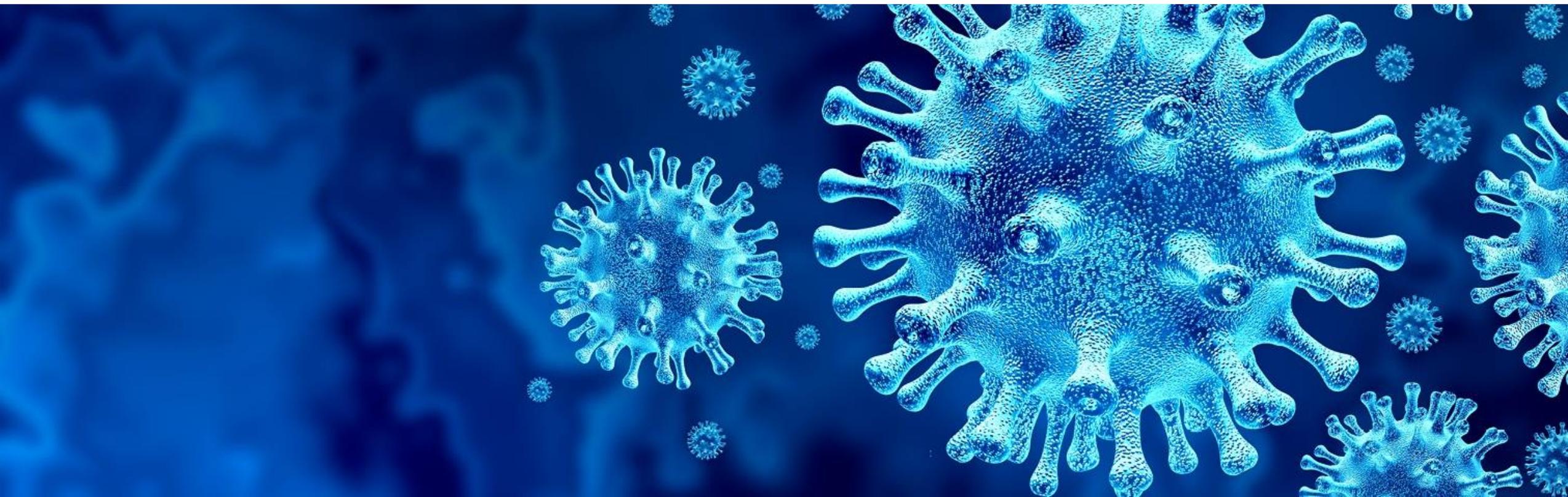


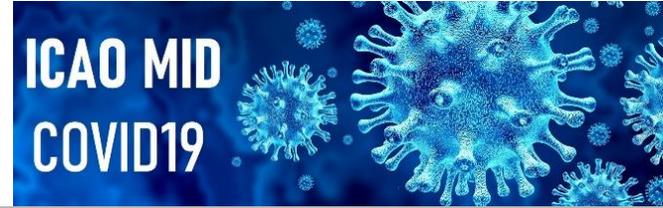


ICAO MID

FIFTH MEETING OF THE PERFORMANCE BASED NAVIGATION SUB-GROUP (PBN SG/5)

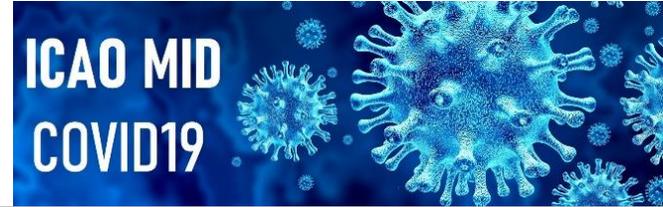
(19 - 20 October 2020)





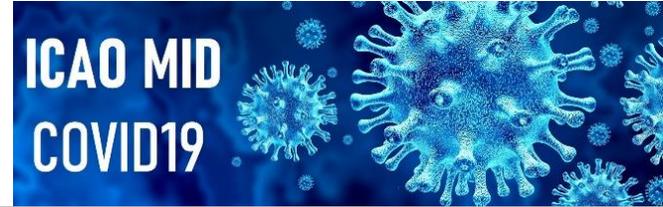
PBN SG/5

Agenda Item 4: Revised MID Air Navigation Strategy



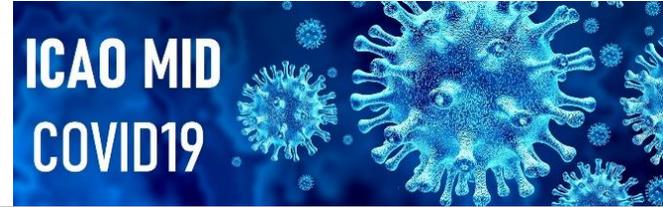
Outline

-  Revised MID Air Navigation Strategy
-  B0 and 1 - APTA (GANP 6th edition)
-  Draft Mid Region APTA threads Block 0 & 1 Prioritization and Monitoring
-  MID APTA Potential Key Performance Indicators (KPIs)
-  Action by the meeting.



Revised MID Air Navigation Strategy

- MSG7 VTC (1 - 3 September 2020) reviewed the draft of the revised Strategy.
- The strategy identified the ASBU Threads/Elements that might be classified as priority 1; along with associated proposed monitoring elements (applicability area, performance indicators/supporting metric, and timeline).
- The meeting agreed also that the MIDANPIRG Sub-Groups should conduct virtual meetings in the 4th quarter of 2020 to review the GANP 6th edition and identify ASBU priority 1 Threads/Elements and associated monitoring elements, considering the Secretariat proposal and States' and stakeholders' inputs.
- MID ASBU Webinar was held on 13 – 15 October 2020 in order to familiarize the participants with the 6th Edition of the GANP and showcase the different ASBU Threads through online demonstration using the GANP Portal, for harmonization purpose and an increased efficiency of the MIDANPIRG Sub-Groups during the discussion of the subject.
- The Webinar reviewed the initial draft of the MID Region Air Navigation Strategy. The webinar agreed on ASBU Threads and Elements prioritization. Monitoring elements (indicators/metrics, applicability areas, targets and timelines) should be discussed during the upcoming MIDANPIRG Sub-Groups virtual meetings;
- The Webinar agreed on an initial list of Key Performance Indicators to be used for performance monitoring at National and Regional levels. Further discussion/ refinement by the MIDANPIRG Sub-Groups.



Revised MID Air Navigation Strategy

- SL: AN 1/5 – 20/178 issued 1 October 2020 on Follow-up to MSG/7 Conclusion 7/6 related to the Update of the MID Region Air Navigation Strategy.
- MSG7 concluded (Conclusion 7/6) that, in order to improve the Initial Draft of the revised MID Region Air Navigation Strategy :
 - a) States be invited to provide the MID Office by 15 October 2020 with their Air Navigation priorities and updated National Plan considering the provisions of the 6th Edition of the GANP endorsed by the 40th Session of the General Assembly (A40);
 - b) MIDANPIRG Sub-Groups provide proposals of amendment of the MID Region Air Navigation Strategy, considering the 6th Edition of the GANP, the inputs of States and Stakeholders, and agreed priorities, before 15 December 2020; and
 - c) the joint ACAO/ICAO ASBU Symposium review the inputs of States, Stakeholders and MIDANPIRG Sub-Groups for consolidation of the revised version of the MID Region Air Navigation Strategy to be presented to MIDANPIRG for endorsement.



File Ref: AN 1/5 – 20/178 1 October 2020

Subject: Follow-up to MSG/7 Conclusion 7/6 related to the Update of the MID Region Air Navigation Strategy

Action Required: Reply not later than 15 October 2020

Sir,
I have the honour to refer to the outcome of the Seventh Meeting of the MIDANPIRG Steering Group (MSG/7), held virtually, 1-3 September 2020, and in particular to the following MSG Conclusion:

MSG Conclusion 7/6: Update of Mid Region Air Navigation Strategy

That, in order to improve the Initial Draft of the revised MID Region Air Navigation Strategy at **Appendix 5.1A**, with States and stakeholders inputs:

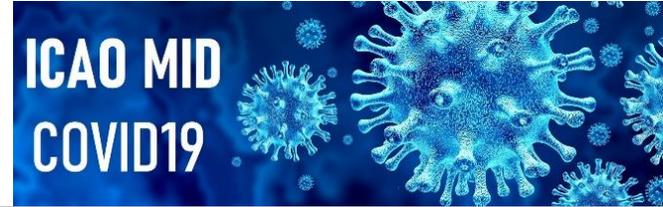
- a) States be invited to provide the MID Office by **15 October 2020** with their Air Navigation priorities and updated National Plan considering the provisions of the 6th Edition of the GANP endorsed by the 40th Session of the General Assembly (A40);
- b) MIDANPIRG Sub-Groups provide proposals of amendment of the MID Region Air Navigation Strategy, considering the 6th Edition of the GANP, the inputs of States and Stakeholders, and agreed priorities, before **15 December 2020**; and
- c) the joint ACAO/ICAO ASBU Symposium review the inputs of States, Stakeholders and MIDANPIRG Sub-Groups for consolidation of the revised version of the MID Region Air Navigation Strategy to be presented to MIDANPIRG for endorsement.

Therefore, you are kindly requested to provide ICAO MID Office with your State's Air Navigation priorities and updated National Air Navigation Plan; not later than **15 October 2020** using the attached **Template**.

Accept, Sir, the assurances of my highest consideration.



Mohamed Smaoui
Acting Regional Director
Middle East Office



B0-APTA (GANP 6th edition)

APTA-B0/1	PBN Approaches (with basic capabilities)
APTA-B0/2	PBN SID and STAR procedures (with basic capabilities)
APTA-B0/3	Cat I Precision Approach Procedures
APTA-B0/4	PBN transitions to/from xLS (with basic capabilities)
APTA-B0/5	PBN Operations for helicopters (with basic capabilities)
APTA-B0/6	CCO and CDO (Basic)
APTA-B0/7	Performance based Aerodrome Operating Minima

B1-APTA (GANP 6th edition)

APTA-B1/1

PBN Approaches (with advanced capabilities)

APTA-B1/2 PBN SID and STAR procedures (with advanced capabilities)

APTA-B1/3 GBAS CAT II/III precision approach procedures

APTA-B1/4 PBN to and from xLS transitions – with advanced capabilities

APTA-B1/5 SID and STAR transitions

APTA-B1/6 Simultaneous operations to parallel runways

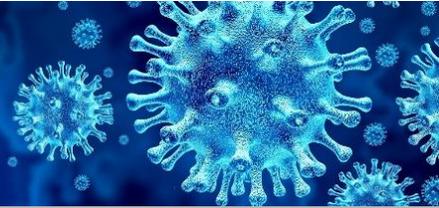
APTA-B1/7 PBN Operations for helicopters (with advanced capabilities)

APTA-B1/8 VPT RNAV Operations

APTA-B1/9 Performance-based aerodrome operating minima (Ground Infrastructure)

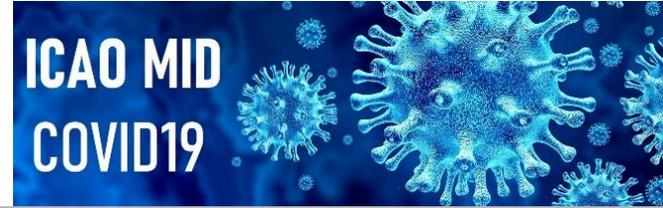
APTA-B1/10 Performance-based aerodrome operating minima (Airborne equipment)

APTA-B1/11 CCO and CDO (Advanced)



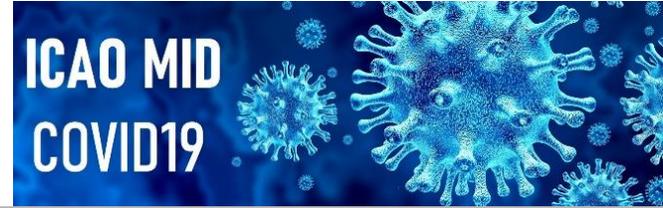
Draft Mid Region APTA threads Block 0 & 1 Prioritization and Monitoring

- The MID Region APTA threads Block 0 & 1 Prioritization and Monitoring is at ***Appendix 4A***



MID APTA Potential key performance indicators (KPIs)

- A set of performance indicators is used that allows for monitoring of current operations.
- ICAO recommends that States utilize a focused set of Key Performance Indicators (KPIs) that provide the means of identifying shortfalls and prioritizing investments.
- This approach will allow all stakeholders to analyze the current and future performance of the air navigation system and to take actions, if needed, to fill the gap between the current performance and the expected one.
- It is proposed to work on a set of KPIs, according to needs and capabilities.
- To start with a simple set of indicators (Core KPIs) matching States needs, and to complete them later with more complex ones (Additional KPIs).
- This would be further reviewed/discussed by the ASBU Symposium before presentation to MIDANPIRG/18 for final decision.
- DRAFT MID REGION Air Navigation KPIs is at **Appendix 4B**



Action by the meeting

The meeting is invited to:

- Review and update the APTA Thread indicators, metrics, targets, timelines, etc.; and
- Note the list of KPIs to be selected for performance monitoring and provide inputs/comments, as appropriate.



ICAO

UNITING AVIATION



ICAO

North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American
(SAM) Office
Lima

ICAO
Headquarters
Montréal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Sub-office
Beijing

Asia and Pacific
(APAC) Office
Bangkok



THANK YOU

DRAFT MID REGION APTA THREADS BLOCK 0 & 1 PRIORITIZATION AND MONITORING

Element code	Title	Priority	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
B0/1	PBN Approaches (with basic capabilities)	1	All RWYs ENDS at International Aerodromes	Indicator: % of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) Supporting metric: Number of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)	100%	Dec. 2017
B0/2	PBN SID and STAR procedures (with basic capabilities)	1	All RWYs ENDS at International Aerodromes	Indicator: % of runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities). Supporting Metric: Number of runways ends at international aerodromes provided with PBN SIDs and STAR (basic capabilities).	70%	Dec. 2022
B0/3	SBAS/GBAS CAT I precision approach procedures	2	AT the state discretion's			
B0/4	CDO (Basic)	1	OBBI, HESH, HEMA, HEGN, OIIE, OIKB, OIFM, OJAI, OJAQ, OKBK, OLBA, OOMS, OTHH, OEJN, OEMA, OEDF, OERK, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CDO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CDO implemented as required.	100% (for the identified Aerodromes/TMAs)	Dec. 2018
B0/5	CCO (Basic)	1	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OIKB, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNN, HSOB, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CCO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CCO implemented as required.	100% (for the identified Aerodromes/TMAs)	Dec. 2018

B0/6	PBN Helicopter Point in Space (PinS) Operations	2	AT the state discretion's			
B0/7	Performance based aerodrome operating minima – Advanced aircraft	1	New element Priority 1 with applicability area TBD	Indicator: % of International Aerodromes with PB AOM implemented for Advanced aircraft as required. Supporting Metric: Number of International Aerodromes with PB AOM implemented for Advanced aircraft as required.	70%	Dec. 2022
B0/8	Performance based aerodrome operating minima – Basic aircraft	2	AT the state discretion's			
B1/1	PBN Approaches (with advanced capabilities)	2	AT the state discretion's			
B1/2	PBN SID and STAR procedures (with advanced capabilities)	2	AT the state discretion's			
B1/3	Performance based aerodrome operating minima – Advanced aircraft with SVGS	2	AT the state discretion's			
B1/4	CDO (Advanced)	2	AT the state discretion's			
B1/5	CCO (Advanced)	2	AT the state discretion's			



International Civil Aviation Organization
DRAFT MID REGION Air Navigation KPIs

PBN SG/5-PPT/4
APPENDIX 4B

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
KPI01	Departure punctuality	Percentage of flights departing from the gate on-time (compared to schedule).	% of scheduled flights	The KPI is typically computed for traffic flows, individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each departing scheduled flight: - Scheduled time of departure (STD) or Scheduled off-block time (SOBT) - Actual off-block time (AOBT)	Schedule database(s), airports, airlines and/or ANSPs
KPI02	Taxi-out additional time	Actual taxi-out time compared to an unimpeded/reference taxi-out time.	Minutes/flight	The KPI is typically computed for individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each departing flight: - Actual off-block time (AOBT) - Actual take-off time (ATOT) In addition, for the advanced KPI variant: - Departure gate ID - Take-off runway ID	Airports (airport operations, A-CDM), airlines (OOOI data), ADS-B data providers and/or ANSPs
KPI03	ATFM slot adherence	Percentage of flights taking off within their assigned ATFM slot (Calculated Take-Off Time Compliance).	% of flights subject to flow restrictions	The KPI is typically computed for individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each departing IFR flight subject to an ATFM regulation: - Calculated Take-Off Time (CTOT) - Actual take-off time (ATOT)	Airports, ATFM service
KPI04	Filed flight plan en-route extension	Flight planned en-route distance compared to a reference ideal trajectory distance.	% excess distance	The KPI can be computed for any volume of en-route airspace; this implies that it can be computed at State level (covering the FIRs of a State).	For each flight plan: - Departure airport (Point A) - Destination airport (Point B) - Entry point in the 'Reference area' (Point O) - Exit point from the 'Reference area' (Point D) - Entry points in the 'Measured areas' (Points N) - Exit points from the 'Measured areas' (Points X) - Planned distance for each NX	ANSPs

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
					portion of the flight	
KPI05	Actual en-route extension	Actual en-route distance flown compared to a reference ideal distance.	% excess distance	The KPI can be computed for a traffic flow or a volume of en-route airspace; this implies that it can be computed at State level (covering the FIRs of a State).	For each actual flight trajectory: <ul style="list-style-type: none"> - Departure airport (Point A) - Destination airport (Point B) - Entry point in the 'Reference Area' (Point O) - Exit point from the 'Reference Area' (Point D) - Entry points in the 'Measured Areas' (Points N) - Exit points from the 'Measured Areas' (Point X) - Distance flown for each NX portion of the actual flight trajectory, derived from surveillance data (radar, ADS-B...). 	ANSPs, ADS-B data providers
KPI06	En-route airspace capacity	The maximum volume of traffic an airspace volume will safely accept under normal conditions in a given time period.	Variant 1: Movements/hr Variant 2: Number of aircraft (occupancy count)	The KPI is typically used at the level of individual sectors (sector capacity) or en-route facilities (ACC capacity).	The various capacities are determined by the ANSP, and are dependent on traffic pattern, sector configuration, ATCO and system capability, etc.	ANSPs
KPI07	En-route ATFM delay	ATFM delay attributed to flow restrictions in a given en-route airspace volume	Minutes/flight	The KPI can be computed for any volume of en-route airspace which participates in the ATFM process.	For each IFR flight: - Estimated Take-off Time (ETOT) computed from the last filed flight plan - Calculated Take-off Time (CTOT) - ID of the flow restriction generating	ATFM

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
					the ATFM delay - Airspace volume associated with the flow restriction - Delay code associated with the flow restriction	
KPI08	Additional time in terminal airspace	Actual terminal airspace transit time compared to an unimpeded time. Actual trajectories are generally longer in time and distance due to path stretching and/or holding patterns. In the example below the unimpeded trajectories are shown in red, and the actual trajectories in green and blue. See Figure 1: Terminal trajectories.	Minutes/flight	The KPI is typically computed for individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each arriving flight: <ul style="list-style-type: none"> - Terminal airspace entry time, computed from surveillance data (radar, ADS-B...) - Actual landing time (ALDT) - In addition, for the advanced KPI variants: <ul style="list-style-type: none"> - Terminal airspace entry segment, computed from surveillance data (radar, ADS-B...) - Landing runway ID 	Airlines (OOOI data), airports, ADS-B data providers and/or ANSPs
KPI09	Airport peak capacity	The highest number of operations an airport can accept in a one-hour time frame (also called declared capacity). Can be computed for arrivals, departures or arrivals + departures.	Number of departures / hour, Number of landings / hour, Number of (departures + landings) / hour	The KPI is computed for individual airports.	Scheduling parameters for slot controlled airports Airport Acceptance Rates (AAR), Airport Departure Rates (ADR)	Airports

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
KPI10	Airport peak throughput	The 95th percentile of the hourly number of operations recorded at an airport, in the “rolling” hours sorted from the least busy to the busiest hour. Can be computed for arrivals, departures or arrivals + departures.	Number of departures / hour, Number of landings / hour, Number of (departures + landings) / hour	The KPI is computed for individual airports.	For each flight: <ul style="list-style-type: none"> - Actual landing time (ALDT) - Actual take-off time (ATOT). 	Airports
KPI11	Airport throughput efficiency	Airport throughput (accommodated demand) compared to capacity or demand, whichever is lower. Can be computed for arrivals, departures or arrivals + departures.	Average Over/Under Delivery or % of accommodated operations.	The KPI is computed for individual airports.	For each arriving and/or departing flight: <ul style="list-style-type: none"> - Actual landing time (ALDT) and take-off time (ATOT) - Estimated landing time (ELDT) and take-off time (ETOT) (from flight plan) For each time interval: <ul style="list-style-type: none"> - Declared landing capacity of the airport - Declared departure capacity of the airport - Declared total capacity of the airport 	Airports
KPI12	Airport/Terminal ATFM delay	ATFM delay attributed to arrival flow restrictions at a given airport and/or associated terminal airspace volume.	Minutes/flight	The KPI is typically computed for individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each IFR flight: <ul style="list-style-type: none"> - Estimated Take-off Time (ETOT) computed from the last filed flight plan - Calculated Take-off Time (CTOT) 	ATFM

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
					<ul style="list-style-type: none"> - ID of the flow restriction generating the ATFM delay - Airport or terminal airspace volume associated with the flow restriction - Delay code associated with the flow restriction 	
KPI13	Taxi-in additional time	Actual taxi-in time compared to an unimpeded/reference taxi-in time	Minutes/flight	The KPI is typically computed for individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each arriving flight: Actual landing time (ALDT) Actual in-block time (AIBT) In addition, for the advanced KPI variant: Landing runway ID Arrival gate ID	Airports (airport operations), airlines (OOOI data), ADS-B data providers and/or ANSPs
KPI14	Arrival punctuality	Percentage of flights arriving at the gate on-time (compared to schedule)	% of scheduled flights	The KPI is typically computed for traffic flows, individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each arriving scheduled flight: <ul style="list-style-type: none"> - Scheduled time of arrival (STA) or Scheduled in-block time (SIBT) - Actual in-block time (AIBT) 	Schedule database(s), airports, airlines and/or ANSPs
KPI15	Flight time variability	Distribution of the flight (phase) duration around the average value.	Minutes/flight	The KPI is typically computed for the scheduled traffic flows interconnecting a given cluster of airports (two or more; selection/grouping based on size and/or geography).	For each flight: <ul style="list-style-type: none"> - OOOI data: gate “out” (AOBT), wheels “off,” wheels “on,” and gate “in” (AIBT) actual times. 	Airlines

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
KPI16	Additional fuel burn	Additional flight time/distance and vertical flight inefficiency converted to estimated additional fuel burn attributable to ATM	kg fuel/flight	This KPI is a conversion of the additional flight time/distance and vertical flight inefficiency KPIs to a corresponding (estimated) additional fuel consumption; hence it describes a performance characteristic of the same objects as the additional flight time/distance and vertical flight inefficiency KPIs: en-route airspace, terminal airspace and airports. Typically the KPI is published at the level of a State or (sub)region.	Indicator values to be converted to estimated additional fuel burn: <ul style="list-style-type: none"> - KPI02 Taxi-Out Additional Time (min/flight) - KPI13 Taxi-In Additional Time (min/flight) - KPI05 Actual en-Route Extension (%) & average en-route distance flown (km/flight) - KPI08 Additional time in terminal airspace (min/flight) - KPI17 Level-off during climb - KPI18 Level capping during cruise & average cruise (ToC-ToD) distance flown (km/flight) - KPI19 Level-off during descent 	Performance analysts
KPI17	Level-off during climb	Distance and time flown in level flight before Top of Climb.	NM/flight and minutes/flight	The KPI is typically computed for traffic flows, individual airports, or clusters of airports (selection/grouping based on size and/or geography).	<ul style="list-style-type: none"> - For each flight trajectory: - 4D data points (latitude, longitude, altitude and time) - Departure airport ARP coordinates - 	Trajectory data providers (reporting archived actual trajectories based on ADS-B and/or other surveillance data sources) and/or ANSPs.
KPI18	Level capping during cruise	Flight Level difference between maximum Flight Levels on a measured airport pair and maximum Flight Levels on similar unconstrained airport	Flight Levels/flight	The KPI is typically computed for traffic flows on individual airport pairs or groups of airport pairs (weighted average).	For each flight trajectory: <ul style="list-style-type: none"> - Maximum cruise Flight Level - Departure airport - Arrival airport 	For variant 1: ANSPs; For variant 2: Trajectory data providers (reporting archived actual trajectories based on ADS-B and/or other surveillance data sources) and/or ANSPs

#	Title	Definition	Measurement Units	Objects Characterized	Data Requirement	Data Feed Providers
		pairs.				
KPI19	Lev Level-off during descentel capping during cruise	Distance and time flown in level flight after Top of Descent.	NM/flight and minutes/flight	The KPI is typically computed for traffic flows, individual airports, or clusters of airports (selection/grouping based on size and/or geography).	For each flight trajectory: <ul style="list-style-type: none"> - 4D data points (latitude, longitude, altitude and time) - Arrival airport ARP coordinates 	Trajectory data providers (reporting archived actual trajectories based on ADS-B and/or other surveillance data sources) and/or ANSPs.

- END -