Second Meeting of Rapporteurs of the North American, Central American and Caribbean Working Group (NACC/WG/RAP/02)

ICAO NACC Regional Office, Mexico City, Mexico, 28 to 31 March 2023

Agenda Item 2: Global Air Navigation Plan (GANP), Seventh Edition

KEY PERFORMANCE INDICATORS (KPIs)

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
This working paper provides an evaluation of the Key Performance Indicators (KPIs) under the new Global Air Navigation Plan (GANP) Seventh Edition that was approved in October 2022 at the 41st ICAO Assembly. The working paper provides an analysis, recommendations and suggested actions that will help establish the regional and national measurement mechanisms of CAR States.	
Action:	Suggested actions are described under item 5.
Strategic Objectives:	• Strategic Objective 1 – Safety • Strategic Objective 2 – Air Navigation Capacity and Efficiency • Strategic Objective 4 – Economic Development of Air Transport • Strategic Objective 5 – Environmental Protection
References:	• Global Air Navigation Plan, seventh version: https://www4.icao.int/ganpportal/

1. **Introduction**

1.1 KPIs are quantitative means of measuring current/past performance, expected future performance as well as actual progress in achieving performance objectives. For Air Navigation Services, they provide information to be reviewed by States on service performance and support decision-making for operational improvements.

1.2 KPIs are key fundamentals that provide information regarding actions taken, systems implemented, and so on. An action allows objective measurement of performance over time for a specific objective.

1.3 With the new version of the Global Air Navigation Plan (GANP), 23 different KPIs were defined, which are listed in **Appendix A** of this working paper and can also be found in this link: https://www4.icao.int/ganpportal/ASBU/KPI.

2. **Performance objective catalogue**

2.1 Key performance area (KPA) is a way of categorizing performance subjects related to high -level ambitions and expectations.

2.2 Performance ambitions, at a global level, will be met by pursuing more specific performance objectives. At a regional level, Volume III of the regional Air Navigation Plans provides regional performance objectives according to specific regional requirements. These objectives are "SMART" — (specific, measurable, achievable, relevant and timely), and although expressed in qualitative terms they may include a desired or required trend for a performance indicator while not yet expressing the performance objective in numeric terms (this is done as part of a performance target setting).

2.3 The regional performance objectives assist the aviation community in identifying relevant and timely enhancements (operational improvements) to a given region's air navigation system. In addition, at a national level, States can set performance targets for their different operational environments using the list of KPIs, taking into account regional performance requirements.

2.4 According to the GANP, Seventh Edition, the performance objectives are:

- Efficiency
- Capacity
- Predictability
- Safety
- Security
- Environment
- Cost effectiveness
- Interoperability
- Access and equity
- Participation by the Air Traffic Management (ATM) community
- Flexibility

Note: See https://www4.icao.int/ganpportal/ASBU/PerformanceObjective for further details.

2.5 Following the assessment of the ASBU elements "Ready for implementation" there are 17 KPIs related to these elements, which are of regional interest and which we as a NACC Working Group must analyze. See **Appendix B** of this working paper for a full list.

2.6 Important notes regarding KPIs:

a. The System Wide Information Management (SWIM), Digital Aeronautical Information Management (DAIM), Advanced Meteorological Information (AMET), Flight and Flow Information for a Collaborative Environment (FF-ICE) modules are information enablers and do not have related KPIs.

b. All modules in the technology thread are also information enablers, Communication infrastructure (COMI), ATS Communication service (COMS),

Alternative Surveillance (ASUR) and Navigation systems (NAVS). They also have no related KPIs.

c. All KPIs are related to operational aviation and airport services, supported by information and technology

2.7 In summary, the ASBU information and technology modules play an important role in the provision of information to provide air navigation services, but performance values are measured through the aeronautical services already in operation.

3. Information needed to establish KPIs

3.1 To obtain the results of the different KPIs it is necessary to obtain pre-set data that feeds the algorithm to calculate the KPI. The necessary information is displayed under the following link: https://www4.icao.int/ganpportal/ASBU/KPI.

3.2 A summary of the 17 KPIs available for the ASBU elements "Ready for Implementation" showing the data requirements and data providers is under **Appendix C** of this Working Paper.

3.3 Data collection involves asking the following questions:

- What type of data is it?
- What is the source of the data?
- What is the precision of the data?
- What is the periodicity with which the data is obtained?
- What are the formatting characteristics of the data?
- What is the data validation process?
- Who are the suppliers of the data?
- What is the metadata of the data (type of data, date, time, system that obtained it, who obtained it, etc.)? A clear and precise definition of the data.

3.4 It is necessary for us as a regional Working Group to establish regional requirements for obtaining this information in terms of the KPIs that are available and that we can assess. There are two important aspects to bear in mind when carrying out this activity:

a) Establish the regional implementation status through the BBBs: https://www4.icao.int/ganpportal/BBB and the ASBU elements in their "Ready for implementation" maturity status.

b) Make a regional analysis to obtain the information that every State could provide. Some States can provide all data; in that sense, as a NACC/WG, we must provide information regarding the minimal requirement that data will integrate.

3.5 Each State, according to the information available, can define the KPIs that apply to its operations and that will feed into its continuous improvement objectives. However, at the regional level, the KPIs that we define should be those for which most of the data is available for each of the States.

3.6   To obtain results that truly define the regional state of performance it is necessary that all States provide information, the same information, that measures KPIs based on equal requirements, only in this way will we obtain data that validly measure regional air navigation performance.

4.   Recommendations

4.1   **Recommendation 1:**   Evaluate the information provided in this working paper and establish an action plan to develop a gap analysis on KPIs regional implementation.

4.2   **Recommendation 2:** Every NACC/WG Task Force must integrate under their Task Force action plan their contributions to establish regional KPIs.

4.3   **Recommendation 3:** It is necessary that as a Regional Group we establish the minimum requirements that each State must meet in order to obtain the data that will feed the KPIs.

5.   Suggested actions

5.1   The Meeting is invited to:

a)   analyze the information provided in this working paper;
b)   each NACC/WG Task Force according to their own evaluation, provide their contribution to the establishment of the regional KPIs;
c)   to jointly set up the pilot programme (draft) as a regional project of the NACC/WG to establish regional KPIs; and
d)   any other actions needed.

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APPENDIX A
Key Performance Indicators (KPIs)

1. KPI01:   Departure punctuality
2. KPI02:   Taxi-out additional time
3. KPI03:   ATFM slot adherence
4. KPI04:   Filed flight plan en-route extension
5. KPI05:   Actual en-route extension
6. KPI06:   En-route airspace capacity
7. KPI07:   En-route ATFM delay
8. KPI08:   Additional time in terminal airspace
9. KPI09:   Airport peak capacity
10. KPI10:   Airport peak throughput
11. KPI11:   Airport throughput efficiency
12. KPI12:   Airport/Terminal ATFM delay
13. KPI13:   Taxi-in additional time
14. KPI14:   Arrival punctuality
15. KPI15:   Flight time variability
16. KPI16:   Additional fuel burn
17. KPI17:   Level-off during climb
18. KPI18:   Level capping during cruise
19. KPI19:   Level-off during descent
20. KPI20:   Number of aircraft accidents
21. KPI21:   Number of runway incursions
22. KPI22:   Number of runway excursions
23. KPI23:   Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

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- APPENDIX B -

ASBU ELEMENTS

ELEMENTS READY FOR IMPLEMENTATION
KEY PERFORMANCE INDICATOR (KPI)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
ACAS (Airborne Collision Avoidance System)					
B1	ACAS-B1/1 ACAS Improvements Operational	Safety		Improve mid-air collision avoidance (safety net)	**KPI20:** Number of aircraft accidents **KPI23:** Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions
APTA (Airport Accessibility)					
B0	APTA-B0/1 PBN Approaches (with basic capabilities) Operational	Capacity	Capacity, throughput & utilization	Equip additional RWY ends with instrument approaches	**KPI10:** Airport peak throughput
		Capacity	Capacity, throughput & utilization	Reduce approach minima (ceiling & visibility)	**KPI10:** Airport peak throughput
B0	APTA-B0/2 PBN SID and STAR procedures (with basic capabilities) Operational	Capacity	Capacity, throughput & utilization	Increase airport arrival rate	**KPI11**: Airport throughput efficiency
		Capacity	Capacity, throughput & utilization	Mitigate local airspace capacity constraints if this is the problem	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Mitigate noise constraints if this is the problem	KPI10: Airport peak throughput
		Efficiency	Vertical flight efficiency	Reduce permanent (airspace and approach procedure design) and	KPI19: Level-off during descent
		Efficiency	Vertical flight efficiency	Reduce permanent (airspace and departure procedure design) and semi-permanent (ATFCM measures) altitude constraints (level capping) along the climb portion of traffic flows, in terminal and en-route airspace	KPI17: Level-off during climb
B0	APTA-B0/3 SBAS/GBAS CAT I precision approach procedures Operational	Capacity	Capacity, throughput & utilization	Equip additional RWY ends with instrument approaches	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Reduce approach minima (ceiling & visibility)	KPI10: Airport peak throughput
B0	APTA-B0/4 CDO (Basic) Operational	Efficiency	Vertical flight efficiency	Avoid efficiency penalties attributable to non-optimum ToD (descent starts before or after the optimum ToD)	KPI19: Level-off during descent
		Efficiency	Vertical flight efficiency	Avoid tactical lengthening of arrival path (eg vectoring, holding, trombone extension) because this leads to level flight	KPI19: Level-off during descent
		Efficiency	Vertical flight efficiency	Reduce descent inefficiency attributable to altitude constraints imposed by ATM	KPI19: Level-off during descent
B0	APTA-B0/5 CCO (Basic) Operational	Efficiency	Vertical flight efficiency	Reduce permanent (airspace and departure procedure design) and semi-permanent (ATFCM measures) altitude constraints (level capping) along the climb portion of traffic flows, in terminal and en-route airspace	KPI17: Level-off during climb
B0	APTA-B0/6 PBN Helicopter Point in Space (PinS) Operations Operational	Capacity	Capacity, throughput & utilization	Mitigate local airspace capacity constraints if this is the problem	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Reduce approach minima (ceiling & visibility)	KPI10: Airport peak throughput

ASBU ELEMENTS

ELEMENTS READY FOR IMPLEMENTATION
KEY PERFORMANCE INDICATOR (KPI)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	APTA-B0/7 Performance based aerodrome operating minima – Advanced aircraft Operational	Capacity	Capacity, throughput & utilization	Reduce approach minima (ceiling & visibility)	KPI10: Airport peak throughput
B0	APTA-B0/8 Performance based aerodrome operating minima – Basic aircraft	Capacity	Capacity, throughput & utilization	Equip additional RWY ends with instrument approaches	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Reduce approach minima (ceiling & visibility)	KPI10: Airport peak throughput

CSEP (Cooperative Separation)					
BLOCK	**Element**	**KPA**	**Focus Area**	**Performance Objective Supported**	**KPI**
B1	CSEP-B1/1 Basic airborne situational awareness during flight operations (AIRB) Operational	Safety		Improve mid-air collision avoidance (safety net)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)
		Safety		Improve separation provision (at a planning horizon > 2 minutes)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)
B1	CSEP-B1/2 Visual Separation on Approach (VSA) Operational	Safety		Improve separation provision (at a planning horizon > 2 minutes)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

FRTO (Improved operations through enhanced en-route trajectories)					
BLOCK	**Element**	**KPA**	**Focus Area**	**Performance Objective Supported**	**KPI**
B0	FRTO-B0/1 Direct routing (DCT) Operational	Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route network design	KPI04: Filed flight plan en-route extension
B0	FRTO-B0/2 Airspace planning and Flexible Use of Airspace (FUA) Operational	Access and equity		Improve airspace reservation management	++
		Efficiency	Flight time & distance	Facilitate direct routing of portions of the flight (if this does not cause network problems)	KPI05: Actual en-route extension
		Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route & airspace availability as known at the flight planning stage	KPI04: Filed flight plan en-route extension
		Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	KPI05: Actual en-route extension
		Efficiency	Flight time & distance	Reduce need to avoid airspace because of lack of confirmation that it will be open	KPI04: Filed flight plan en-route extension

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ELEMENTS READY FOR IMPLEMENTATION
KEY PERFORMANCE INDICATOR (KPI)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb to avoid Special Use Airspace	KPI17: Level-off during climb
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise to avoid Special Use Airspace	KPI18: Level capping during cruise
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	KPI19: Level-off during descent
B0	FRTO-B0/3 Pre-validated and coordinated ATS routes to support flight and flow Operational	Capacity	Capacity shortfall & associated delay	Establish/update/publish the catalogue of strategic ATFM measures designed to respond to a variety of possible/typical/recurring events degrading the airspace system (e.g. predefined action plans)	No KPI
		Flexibility		Improve flexibility of the Air Navigation System	No KPI
B0	FRTO-B0/4 Basic conflict detection and conformance monitoring Operational	Capacity	Capacity, throughput & utilization	Reduce ATCO workload (en-route)	KPI06: En-route airspace capacity
		Safety		Avoid vertical & lateral navigation errors during flight (cases of non-conformance with clearance)	KPI20: Number of aircraft accidents
		Safety		Improve early detection of conflicting ATC Clearances (CATC) (en-route / departure / approach)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)
		Safety		Improve separation provision (at a planning horizon > 2 minutes)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

NOPS (Network Operations)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	NOPS-B0/1 Initial integration of collaborative airspace management with air traffic flow management Operational	Efficiency	Flight time & distance	Facilitate tactical decisions leading to a shorter actual route than in the FPL	KPI05: Actual en-route extension
		Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route & airspace availability as known at the flight planning stage	KPI04: Filed flight plan en-route extension
		Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	KPI05: Actual en-route extension
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb introduced to avoid airspace above	KPI17: Level-off during climb
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise introduced to avoid airspace above	KPI18: Level capping during cruise
		Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	KPI19: Level-off during descent
B0	NOPS-B0/5 Dynamic ATFM slot allocation Operational	Capacity	Capacity shortfall & associated delay	Implement TMIs to delay take-off times	KPI07: En-route ATFM delay

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ELEMENTS READY FOR IMPLEMENTATION
KEY PERFORMANCE INDICATOR (KPI)

OPFL (Improved access to optimum flight levels in oceanic and remote airspace)					
BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	OPFL-B0/1 In Trail Procedure (ITP) Operational	Efficiency	Vertical flight efficiency	Increase acceptance of pilot requests for higher cruise level	KPI18: Level capping during cruise
		Efficiency	Vertical flight efficiency	Reduce level restrictions during cruise issued by ATCOs for conflict	KPI18: Level capping during cruise
B2	OPFL-B2/1 Separation minima using ATS surveillance systems where VHF voice communications are not available Operational	Efficiency	Flight time & distance	Improve route selection after the flight planning stage	KPI05: Actual en-route extension
		Efficiency	Flight time & distance	Improve route selection at the flight planning stage	KPI04: Filed flight plan en-route extension
		Efficiency	Fuel burn	Reduce fuel burn impact of impeded conditions	KPI16: Additional fuel burn
		Efficiency	Vertical flight efficiency	Reduce vertical flight inefficiency during the cruise phase	KPI18: Level capping during cruise

RSEQ (Improved traffic flow through runway sequencing)					
BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	RSEQ-B0/1 Arrival Management Operational	Capacity	Capacity, throughput & utilization	Apply arrival balancing	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Apply smart sequencing to harmonise final approach speeds (arrival)	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Apply smart sequencing to optimise wake vortex separations	KPI10: Airport peak throughput
		Capacity	Capacity, throughput & utilization	Improve arrival sequencing and metering to fill all arrival slots	KPI11: Airport throughput efficiency
		Efficiency	Flight time & distance	Apply TTA and en-route speed reduction if traffic is already airborne	KPI08: Additional time in terminal airspace
		Efficiency	Flight time & distance	Reduce need to fine-tune traffic spacing in terminal airspace (arrival)	KPI08: Additional time in terminal airspace
B0	RSEQ-B0/2 Departure Management Operational	Capacity	Capacity, throughput & utilization	Maintain or improve departure rate of the RWY	KPI10: Airport peak throughput
		Efficiency	Flight time & distance	Avoid additional holding time after line up caused by departure metering not factored in during pushback planning	KPI02: Taxi-out additional time
		Efficiency	Flight time & distance	Improve the delivery of departing traffic into the overhead stream	KPI02: Taxi-out additional time
B0	Point merge Operational	Capacity	Capacity, throughput & utilization	Apply merging & synchronisation of arrival flows	KPI10: Airport peak throughput

SNET (Ground-based Safety Nets)					
BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	SNET-B0/1 Short Term Conflict Alert (STCA) Operational	Safety		Improve mid-air collision avoidance (safety net)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

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KEY PERFORMANCE INDICATOR (KPI)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	SNET-B0/2 Minimum Safe Altitude Warning (MSAW) Operational	Safety		Avoid controlled flight into terrain (CFIT) and obstacle collision risk	KPI20: Number of aircraft accidents
B0	SNET-B0/3 Area Proximity Warning (APW) Operational	Safety		Avoid unauthorized penetration of segregated airspace	KPI20: Number of aircraft accidents
B0	SNET-B0/4 Approach Path Monitoring (APM) Operational	Safety		Avoid controlled flight into terrain (CFIT) and obstacle collision risk	KPI20: Number of aircraft accidents
B1	SNET-B1/1 Enhanced STCA with aircraft parameters Operational	Safety		Improve mid-air collision avoidance (safety net)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)
B1	SNET-B1/2 Enhanced STCA in complex TMAs Operational	Safety		Improve mid-air collision avoidance (safety net)	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

SURF (Surface operations)

BLOCK	Element	KPA	Focus Area	Performance Objective Supported	KPI
B0	SURF-B0/1 Basic ATCO tools to manage traffic during ground operations Operational	Efficiency	Flight time & distance	Avoid taxi-in additional time resulting from adverse conditions	KPI13: Taxi-in additional time
		Efficiency	Flight time & distance	Avoid taxi-out additional time resulting from adverse conditions	KPI02: Taxi-out additional time
		Safety		Avoid incorrect entries of aircraft or vehicles onto the runway protected area (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
		Safety		Avoid incorrect runway crossings by aircraft or vehicles (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
		Safety		Avoid incorrect taxiing (cases of non-conformance with clearance)	KPI20: Number of aircraft accidents
B0	SURF-B0/2 Comprehensive situational awareness of surface operations Operational	Safety		Improve collision avoidance during taxi operations (safety net)	KPI20: Number of aircraft accidents
		Safety		Avoid incorrect entries of aircraft or vehicles onto the runway protected area (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
		Safety		Avoid incorrect presence of vacating aircraft or vehicles onto the runway protected area	KPI20: Number of aircraft accidents KPI21: Number of runway incursions

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KEY PERFORMANCE INDICATOR (KPI)

		Safety		Avoid incorrect runway crossings by aircraft or vehicles (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
B0	SURF-B0/3 Initial ATCO alerting service for surface operations Operational	Safety		Improve runway collision avoidance (safety net)	KPI20: Number of aircraft accidents
B1	SURF-B1/2 Comprehensive pilot situational awareness on the airport surface Operational	Safety		Improve collision avoidance during taxi operations (safety net)	KPI20: Number of aircraft accidents
		Safety		Avoid incorrect entries of aircraft or vehicles onto the runway protected area (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
		Safety		Avoid incorrect presence of vacating aircraft or vehicles onto the runway protected area	KPI20: Number of aircraft accidents KPI21: Number of runway incursions
		Safety		Avoid incorrect runway crossings by aircraft or vehicles (without or contrary to ATC clearance or due to incorrect ATC clearance)	KPI20: Number of aircraft accidents KPI21: Number of runway incursions

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No	KPI	Data Requirement	Data Feed Providers
1	KPI02: Taxi-out additional time	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
2	KPI04: Filed flight plan en-route extension	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 portion of the flight	ANSPs
3	KPI05: Actual en-route extension	For each actual flight trajectory: 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
4	KPI06: En-route airspace capacity	The various capacities are determined by the ANSP, and are dependent on traffic pattern, sector configuration, ATCO and system capability, etc.	ANSPs
5	KPI07: En-route ATFM delay	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 the ATFM delay - Airspace volume associated with the flow restriction - Delay code associated with the flow restriction	ATFM Providers
6	KPI08: Additional time in terminal airspace	For each arriving flight: Terminal airspace entry time, computed from surveillance data (radar, ADS-B…) Actual landing time (ALDT) In addition, for the advanced KPI variants: 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
7	KPI10: Airport peak throughput	For each flight: Actual landing time (ALDT) Actual take-off time (ATOT).	Airports

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No	KPI	Data Requirement	Data Feed Providers
8	KPI11: Airport throughput efficiency	For each arriving and/or departing flight: 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: Declared landing capacity of the airport Declared departure capacity of the airport Declared total capacity of the airport	Airports
9	KPI13: Taxi-in additional time	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. Note: OOOI Data refers to times of the actual aircraft movements of Gate Out, Wheels Off, Wheels On, and Gate In.
10	KPI16: Additional fuel burn	Indicator values to be converted to estimated additional fuel burn: 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
11	KPI17: Level-off during climb	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.
12	KPI18: Level capping during cruise	For each flight trajectory: 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
13	KPI19: Level-off during descent	For each flight trajectory: 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.
14	KPI20: Number of aircraft accidents	For each reported occurrence: Date of occurrence Occurrence Category State of occurrence	ICAO ADREP database; iSTARS Application "ADREP et al." Note: ADREP: Accident Data Report. https://www.icao.int/safety/airnavigation/AIG/Pages/Reporting.aspx

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No	KPI	Data Requirement	Data Feed Providers
15	KPI21: Number of runway incursions	For each reported occurrence: Date of occurrence Airport of occurrence	Airports and airlines
16	KPI22: Number of runway excursions	For each reported occurrence: Date of occurrence Airport of occurrence	Airports and airlines
17	KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)	For each reported occurrence: Date of occurrence FIR of occurrence	ANSPs and airlines