International Civil Aviation Organization
South American Regional Office
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(Virtual, 20 to 23 September 2021)

SAM/IG/26-WP/2.11
03/09/2021

Agenda Item 2: GESEA and Subgroups Activity Report

ACTIONS TAKEN BY THE PERUVIAN STATE TO OPTIMIZE AIR TRAFFIC FLOW MANAGEMENT THROUGH THE USE OF KEY PERFORMANCE INDICATORS

(Prepared by Peru)

SUMMARY

This working paper presents the progress made in the application of management indicators by the monitoring of air traffic flow service provision in the Peruvian State.

This note shows the progress in the implementation of indicators proposed by Peru in the SAM/IG/21 and GANP indicators, as well as the development of new measurements and visualization tools.

References:

- Global Air Navigation Plan (GANP) - Sixth Edition
- National Air Navigation Plan - DGAC Peru
- ATFM Manual, Doc. 9971, Third Edition, OACI
- Informative Note SAM/IG/22-NI/26

1. Background

1.1 In 2016, the Peruvian State implemented the ATFM service through Lima and Cusco Flow Management Position (FMP). In that year, the first model of performance indicators of the ATFM system was presented at the Eighteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/18-NE/15) of ICAO.

1.2 In 2018 at the Twenty-Second Workshop/Meeting of the ICAO SAM Implementation Group (SAM/IG/22), these indicators were updated and presented (SAM/IG/22-NI/26). In this way, the Peruvian State identified some performance indicators to quantitatively represent the performance of the ATFM service and airport operations.

1.3 Subsequently, with the Sixth Edition of the Global Air Navigation Plan and the publication of the Peruvian National Air Navigation Plan, the DGAC began to analyze the key performance indicators from this document, as well as its own indicators, which were added to the monthly ATFM service performance monitoring reports.

1.4 With the purpose of a better visualization for decision-making at the management level, in May 2021, the development of a dashboard in the Power Bi application began.

2. Analysis

2.1 ***Selection of performance indicators:*** Since the beginning of the provision of flow management services in 2016, monthly reports were prepared that initially showed the average delay by CTOT assignment of province flights to the AIJCH, as well as compliance of this time compare to the ATD of the aircraft.

2.1.1 Considering the Sixth Edition of the GANP and the experience in the provision of the ATFM service in the Peruvian State, the GANP indicators applicable to our need and feasibility in obtaining information were identified, as well as our own ATFM system indicators were developed, with the purpose of monitoring system performance.

2.1.2 The indicators created by the Peruvian State (KPI-PER-ATFM) and those suggested in the GANP (KPI) are shown below:

KPI	CODE	NAME
EFFICIENCY	KPI01	Departure punctuality
	KPI14	Arrival punctuality
	KPI-PER-ATFM 05	Estimated Taxi-out time - EXOT
	KPI-PER-ATFM 06	Estimated Taxi in time - EXIT
CAPACITY	KPI-PER-ATFM 01	Utilization of declared runway capacity during FMP operation
	KPI-PER-ATFM 04	Utilization of declared runway capacity
CAPACITY AND EFFICIENCY	KPI-PER-ATFM 03	CTOT Compliance
	KPI-PER-ATFM 02	Estimated delay by CTOT allocation

2.1.3 In this way, the Peruvian State, through monthly reports, was able to obtain ATFM service performance metrics, identify problems and opportunities for improvement, as well as future projections of the system's capacity based on available historical data.

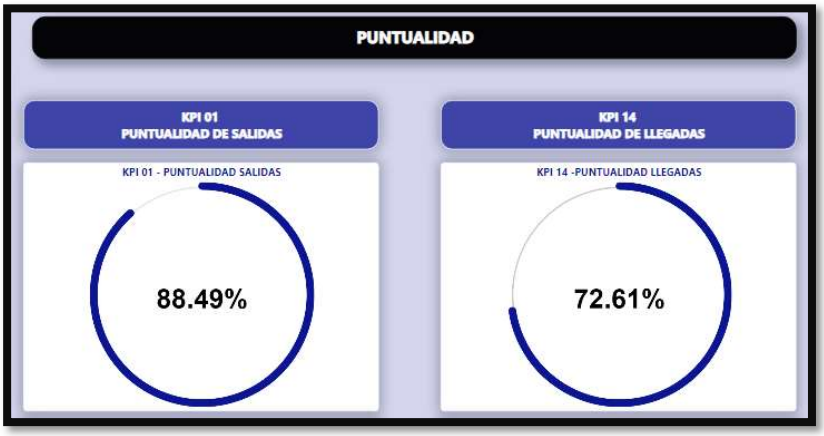
2.2 ***Required data*:** The measurement of the key performance indicators requires information from different sources as shown in the following table.

FUENTE	KPI
DGAC / LAP / CORPAC	Departure punctuality
DGAC / LAP / CORPAC	Arrival punctuality
LAP	Estimated Taxi-out time - EXOT
LAP	Estimated Taxi in time - EXIT
LAP / CORPAC	Utilization of declared runway capacity during FMP operation
LAP / CORPAC	Utilization of declared runway capacity
CORPAC	CTOT Compliance
CORPAC	Estimated delay by CTOT allocation

2.3 ***Key performance indicators – Efficiency:***

2.3.1 *KPI 01 Departure punctuality and KPI 14 Arrival punctuality:* These KPIs analyze the data (EIBT / EOBT) of the monthly flight schedule, which, once the month is over, are compared with the information on flights registered by the aerodrome operator. Regular flights only are considered for the measurement of these KPIs.

2.3.1.1 The measurement of these KPIs will show the increase or reduction in percentage points of those flights that were not delayed in their departure or arrival compare to the scheduled time, as shown in the following graph as an example



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	KPI 01 Departure punctuality:	KPI 14 Arrival punctuality
DEFINITION	% of flights departing from the parking stand (PEA) on time (compared to schedule)	% of flights arriving at the parking stand (PEA) on time (compared to schedule)
VALUES	´+ /- 15 min	´+ /- 15 min
REQUIRED DATA	SOBT - Scheduled Off Block Time AOBT - Actual Off Block Time	SIBT - Scheduled In Block Time AIBT - Actual In Block time
FORMULA	*(Scheduled departures only)* *Group as: Punctual or Not Punctual* ***N° punctual departures / N° total number of scheduled departures***	*(Scheduled arrivals only)* *Group as: On time or Not On Time* ***N° on-time arrivals / N° total number of scheduled arrivals***

2.3.2 *KPI -PER-ATFM 05 - Estimated Taxi-out time EXOT:* This KPI allows to determine the average taxi times according to the geographical distribution of the parking spaces on the airport aprons. In the same way, it helps to identify occurrences that could have affected the efficiency of the airport taxiway, including aprons. Calculates the difference between the Actual Off-block Time (AOBT) and the Actual Departure Time, resulting in the departure taxi time. This indicator is directly related to KPI02 Taxi-out additional time described in the GANP.

2.3.3 *KPI -PER-ATFM 06 - Estimated Taxi-in time EXIT:* This KPI allows to determine the average taxi times according to the geographical distribution of the parking spaces on the airport aprons. In the same way, it helps to identify occurrences that could have affected the efficiency of the airport taxiway system, including aprons. It calculates the difference between the Actual In-block Time (AIBT) and the

Actual Time of Arrival, resulting in the taxi-in time on arrival. This indicator is directly related to KPI13 Taxi-in additional time described in the GANP.

	KPI-PER-ATFM 05 Estimated Taxi-out time EXOT	KPI-PER-ATFM 06 Estimated Taxi-in time EXIT
DEFINITION	Displays the average taxi time from when an aircraft leaves Parking Stand (PEA) until it takes off	Shows average taxi time from landing to entering Parking Stand. (PEA).
REQUIRED DATA	AOBT – Actual Off-block Time ATOT - Actual Take-off Time	ATA - Actual Time of Arrival AIBT - Actual In-Block Time
FORMULA	Average time (AOBT - ATD)	Average time (ATA - AIBT)

2.4 ***Key Performance Indicators - Capacity:***

2.4.1 *KPI -PER-ATFM 01 Utilization of declared runway capacity during FMP operation:* This KPI identifies during the hours in which the capacity was exceeded during the FMP operation time. The objective is to determine the FMU´s efficiency on the pre-tactical management, through the application of ATFM measures, in order to achieve a balance between the demand and the declared runway capacity.

2.4.2 *KPI -PER-ATFM 04 Utilization of declared runway capacity:* This KPI identifies the number of operations (arrivals/departures) at the AIJCH airport during the twenty-four hours of the day. The objective is to identify that the FMU operating hours are adequate for an efficient management of the ATFM service.

OPERACIONES JUNIO 2021																															
HORA UTC	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun	TOTAL
00:00	7	11	10	12	10	10	11	10	13	11	14	8	8	11	14	9	10	12	11	14	13	12	12	9	11	11	8	11	12	12	327
01:00	4	9	10	12	10	9	10	11	12	10	15	10	16	15	7	11	12	12	6	10	9	9	11	9	9	10	15	9	8	9	309
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04:00	4	6	5	5	6	8	4	4	6	3	4	7	7	3	4	6	2	4	4	4	4	3	5	4	3	2	5	3	3	5	133
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06:00	7	4	9	10	8	6	6	6	5	8	8	6	7	7	7	5	5	4	4	5	4	4	6	5	4	3	5	6	7	3	174
07:00					1	1	1		1	1	1		2			2	1	1	3	2	1	2	3	2	3	2	1	3	3	2	39
08:00					1	2	1	1	1	1	1	1	1	1	1					1	3						1			1	18
09:00															2		1	1	1	3	1	2	1	1	1	1		2	2		19
10:00	7	8	8	3	6	5	6	5	7	4	5	7	7	8	4	7	4	5	4	3	5	4	5	3	5	7	5	6	4	5	162
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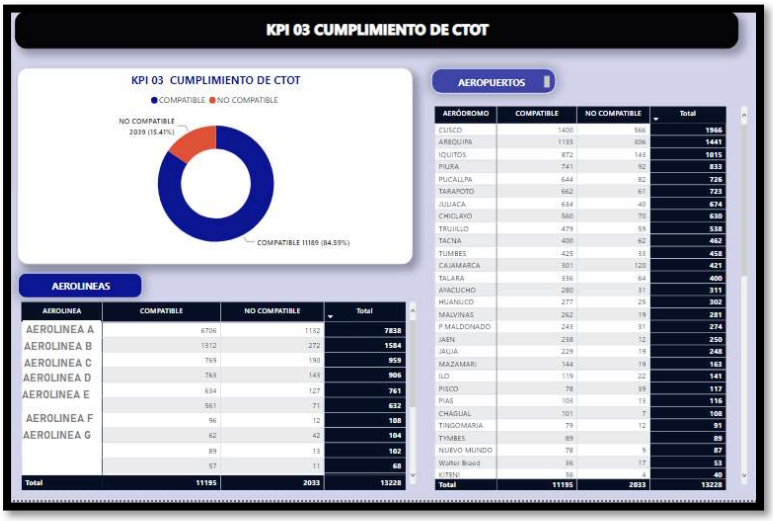
20:00	13	15	16	20	14	14	11	16	10	18	12	14	12	14	15	10	17	14	15	10	12	14	11	18	15	17	9	15	11	15	417
21:00	21	14	18	17	17	16	22	21	16	15	16	15	19	19	19	18	22	21	13	16	20	13	17	22	17	15	19	15	14	15	522
22:00	15	18	16	19	21	16	18	18	18	24	21	17	17	21	17	21	16	14	17	14	14	19	13	16	15	16	13	15	18	18	515
23:00	18	11	19	19	15	12	11	15	11	12	16	16	12	9	16	12	16	19	11	14	12	13	12	14	15	12	12	11	15	19	419
TOTAL DIA	269	252	278	302	257	241	267	256	264	276	292	259	254	280	265	269	277	285	252	249	273	247	250	269	263	262	241	264	235	280	7928

2.5 ***Key Performance Indicators - Capacity and Efficiency***

2.5.1 *KPI-PER-ATFM 03 CTOT Compliance:* This KPI shows the management of the ATFM in order to use the capacity of an airport efficiently, delivering traffic in a predictable manner to the destination airport. It allows to determine the performance of the coordination between ATS units from province and the FMU, and also allows identifying the impact of the FMU pre-tactical planning on the air traffic through

the application of the CTOT. This indicator is directly related to KPI03ATFM slot adherence described in the GANP.

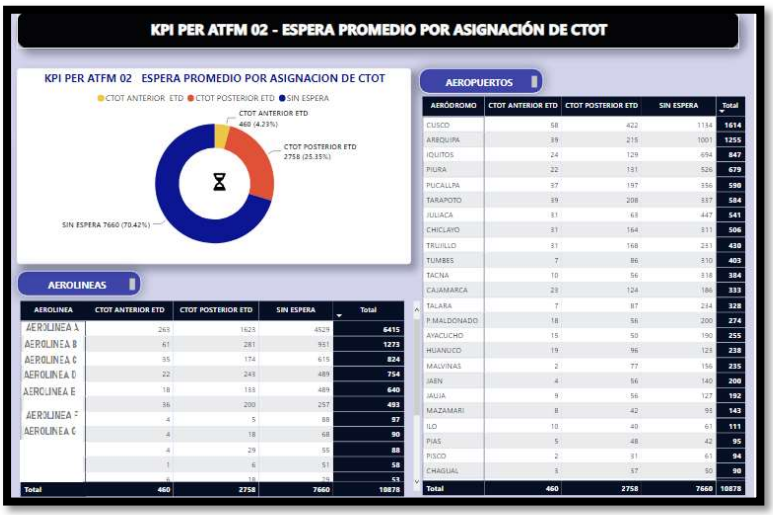
2.5.1.1 Compliance with the CTOT is considered when the actual take-off time is within the established tolerance of +/- one (1) minute from the assigned CTOT, as shown in the following graph as an example.



	KPI- PER-ATFM 03 CTOT Compliance
DEFINITION	Shows adherence to CTOT compliance assigned to flights taking off to the destination airport.
VALUES	′+ /- 1 min
REQUIRED DATA	CTOT assigned by FMP ATOT - Actual Takeoff Time
FORMULA	*(Only departures with CTOT assigned)* *Group as: Compatible or Not Compatible* *N° compatible outlets / Total N° departures subject to GDP*

2.5.2 *KPI -PER-ATFM 02 Estimated delay by CTOT allocation:* This KPI shows the average delay on ground during the hours with the highest air traffic congestion of those flights subject to GDP. The objective is to identify the effectiveness of CTOT in the ATC management in order to maintain the balance between demand and capacity.

2.5.2.1 For the KPI calculation, delay is considered when the difference between the CTOT granted and the proposed Estimated Time of Departure (ETD) is greater or equal to 1 minute.



	KPI-PER-ATFM 02 Estimated delay by CTOT allocation
DEFINITION	Shows the estimated delay of an aircraft subject to GDP.
VALUES	′+ /- 1 min
REQUIRED DATA	ETD - Estimated Time of Departure ATD - Actual Time of Departure
FORMULA	**ETD = ATD = Not delayed** **ETD > ATD = Not delayed** **ETD < ATD = Delayed**

3. Suggested actions

3.1 The Meeting is invited to:

a) Take note of the information provided in the working paper;

b) it is suggested that States adopt the use of standardized indicators and metrics, as well as agree on best practices for a common data collection to measure the performance of the ATFM service provided; and

c) evaluate the KPIs proposed by the Peruvian State and those in the GANP, analyzing their applicability in a regional standardization.

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