



Agenda Item 6: Other business

ACTION TAKEN BY EANA S.E. TO OPTIMISE AIR TRAFFIC MANAGEMENT THROUGH MEASUREMENT OF INDICATORS

(Presented by Argentina)

SUMMARY

This working paper presents the development of air navigation service management indicators in Argentina.

It also follows up on issues set forth in SAM/IG/22-WP/19, and presents new measurements and displays. The Meeting is invited to analyse them and suggest new approaches, and to share the methodology with the other participants in order to establish common metrics for the SAM Region.

References:

- ICAO Doc 9883
- ICAO Doc 9060
- Recommended Key Performance Indicators for Measuring ANSP Operational Performance - CANSO

1. Background

1.1 In August 2016, after EANA S.E. took on the provision of the service, its statistics unit started regular publications, generating basic indicators for the sector.

1.2 Contact was established with airlines with a view to working together on ATC-related delays in the STD.

1.3 However, operational indicators still needed to be analysed. Accordingly, an analysis began of the data received manually from the ATM system (INDRA) on each of the five FIRs contained in Argentinian airspace. In August 2018, data automation started.

2. Actions

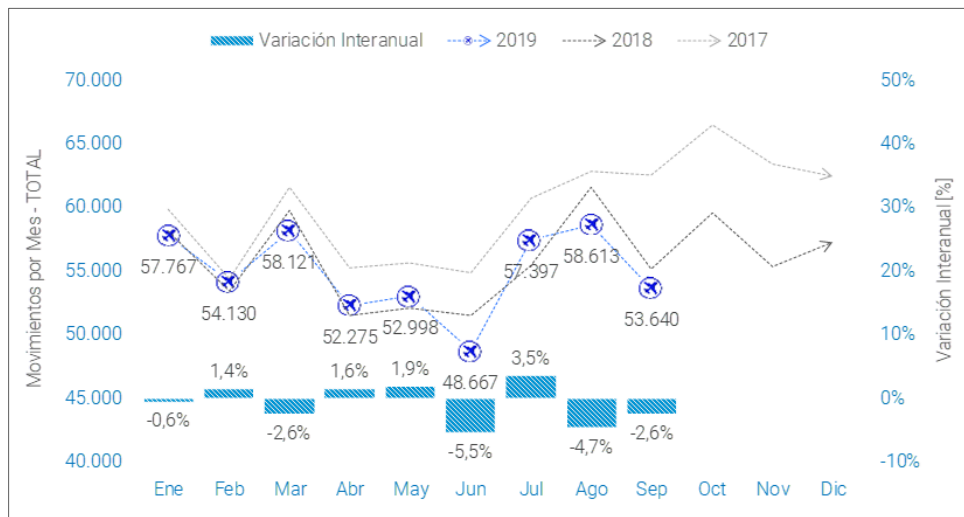
2.1 **New monthly report:** Between August 2016 and December 2018, a number of publications were issued in response, primarily, to the needs of the commercial aviation sector, focusing on passengers. When this task was transferred to the authority (ANAC), a report was drafted on controlled airspace management in Argentina, covering all types of flights: commercial, private and the rest of general aviation, as well as international overflights. The report will be published soon in the statistics section of

EANA’s website: <https://www.eana.com.ar/estadisticas>.

2.1.1 The different sections will show various aspects of air traffic management, as well as the characteristics of the various types of operations performed.

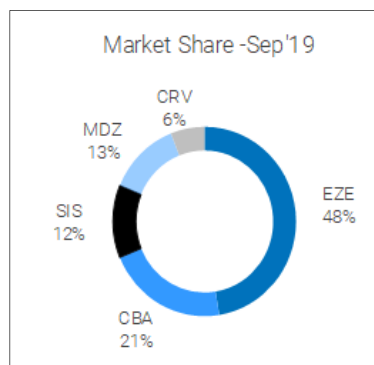
2.1.2 The report provides information on a monthly and annual basis and, sometimes, the cumulative for the moving year, providing a general context of aeronautical evolution. Some examples of the graphs and tables contained in the report are shown below.

2.1.3 The first part focuses on total movements, including international overflights. The following graph is an example of the information that may be found, showing evolution over the years, allowing for an analysis of inter-annual variation.



Graph 1

2.1.4 The second section shows the total number of flights managed by the ACCs, broken down by region, for each moving year, together with the percentage of flights per month.

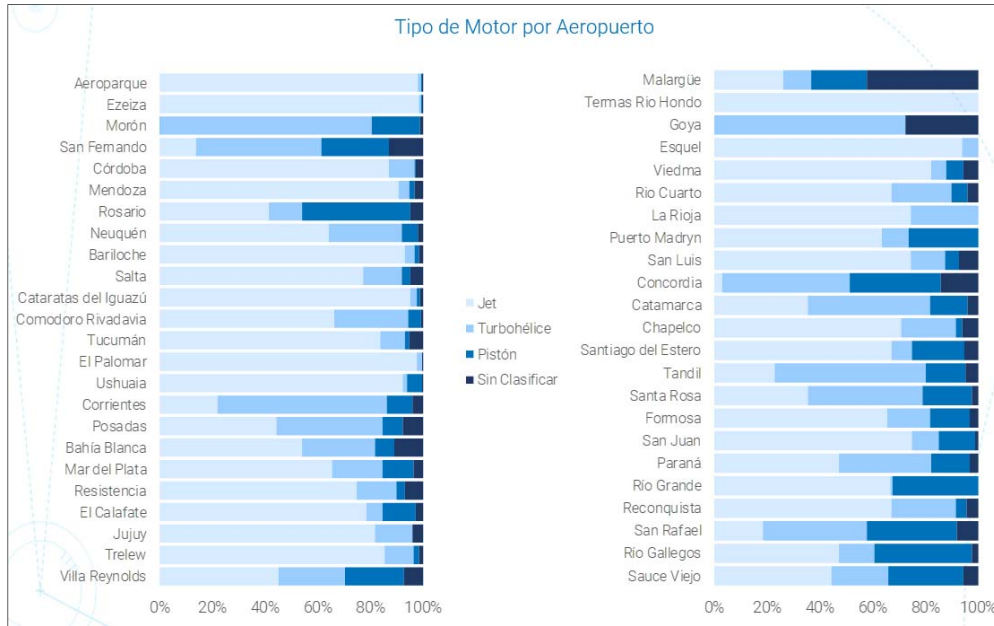


Graph 2

2.1.5 The next section breaks down movements into commercial, private, and the rest of general aviation, showing the evolution of each component during the moving year. As an example, the following table is shown:

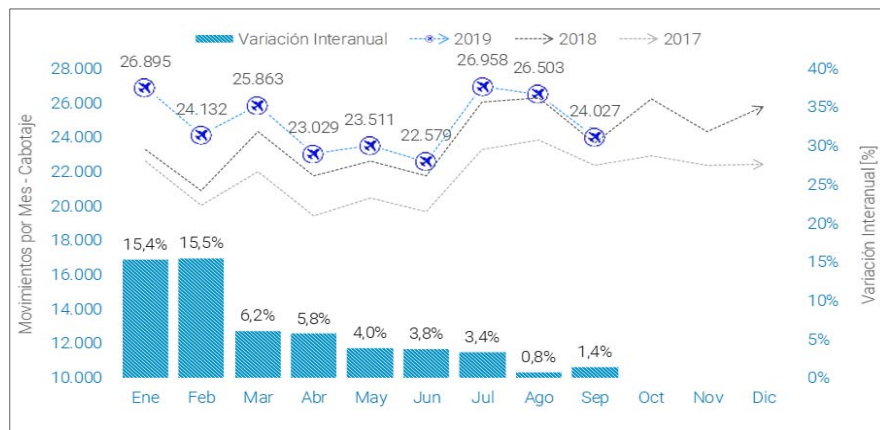
Vuelos [#]	Ene-Sep	Ene-Sep	2018	2018	2018	2018	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	Δ Sep'19 vs. Sep'18	Δ 2019 vs. 2018	
	2018	2019	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep								
Comercial	185.074	185.445	19.936	21.677	20.307	22.113	23.983	20.899	21.746	19.063	19.090	18.576	21.633	21.026	19.429							-3%	0%
Regular	170.200	172.767	18.630	20.024	18.719	20.475	22.191	19.403	20.213	17.748	17.880	17.387	20.142	19.682	18.121							-3%	2%
No Regular	14.874	12.678	1.306	1.653	1.588	1.638	1.792	1.496	1.533	1.315	1.210	1.189	1.491	1.344	1.308							0%	-15%
Privado	36.534	31.842	3.718	4.121	4.022	4.078	3.723	3.495	3.920	3.728	3.517	2.834	3.483	3.802	3.340							-10%	-13%
Nacional	33.160	29.015	3.397	3.711	3.582	3.659	3.376	3.181	3.550	3.370	3.211	2.595	3.186	3.516	3.030							-11%	-13%
Extranjero	3.374	2.827	321	410	440	419	347	314	370	358	306	239	297	286	310							-3%	-16%
Resto Aviación General	45.001	42.214	5.278	5.641	4.816	4.104	3.370	4.162	4.953	4.805	5.139	4.137	4.785	5.618	5.247							-1%	-6%
TOTAL	266.609	259.501	28.932	31.439	29.145	30.295	31.076	28.556	30.619	27.596	27.746	25.547	29.901	30.446	28.016							-3%	-3%

Table 1



Graph 3

2.1.6 Finally, the last section refers only to commercial aviation, divided into domestic and international flights. This part is broken down by airline and most used routes.



Graph 4

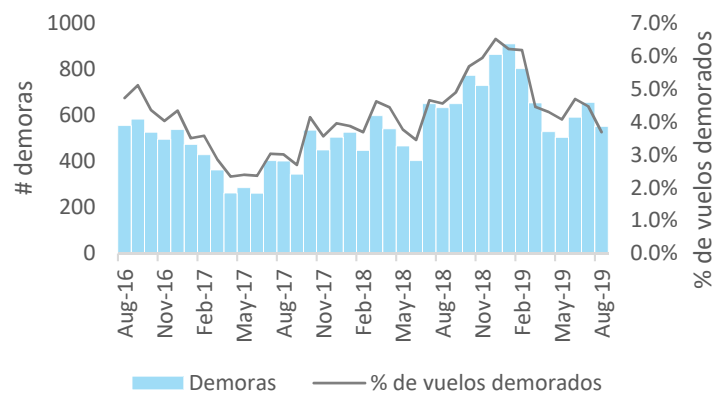
2.2 **Departure delays:** airlines voluntarily provide data on which flights experienced ATC-related delays on departure. Based on that, a monthly report for internal distribution is prepared to provide feedback to those involved in day-to-day operations. Likewise, many regular meetings are held with companies to expand the analysis.

2.2.1 The statistics unit conducts an in-depth analysis of the quality of the data sent by airlines in order to obtain accurate and reliable information leading to sound management decisions. To this end, work is carried out jointly with the safety and airport sectors in order to obtain detailed flight information from the analysis of flight strips and recordings.

2.2.2 Improvements were not only qualitative, based on ATC and user perception, but were also measured and calculated quantitatively.

2.2.3 The results obtained were as follows:

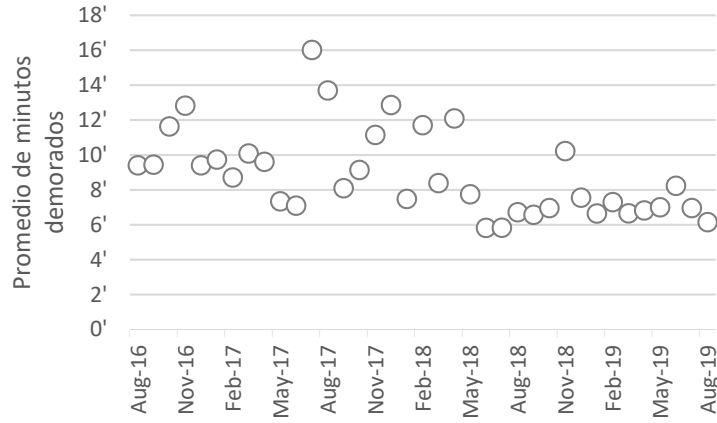
2.2.3.1 One percentage point reduction of the percentage of flights experiencing ATC-related delays between August 2016 and August 2019, from 4.7% to 3.7 % of flights. Regarding SAM/IG/22-WP/19, an improvement of 0.9 percentage points (4.6%) was observed.



Graph 5

2.2.3.2 Market coverage is 87%, considering commercial, scheduled and non-scheduled aviation. This represents an increase of 3 percentage points with respect to SAM/IG/22-WP/19.

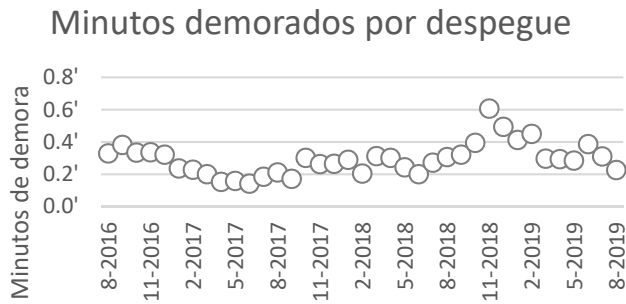
2.2.3.3 The average of minutes delayed due to the ATC in August 2019 was 6' per delayed flight, a 1' improvement with respect to SAM/IG/22-WP/19 and 3' since EANA S.E began operations.



Graph 6

2.2.3.4 Minutes of delay on take-off in August 2019 were 0.2', an improvement of 0.1' per take-off with respect to August 2016. This indicator considers total minutes delayed, and compares it with the total number of take-offs in order to obtain the delay by individual flight.

Graph 7



2.2.4 A dashboard was developed to show the main indicators at national level and by FIR, airport or airline.

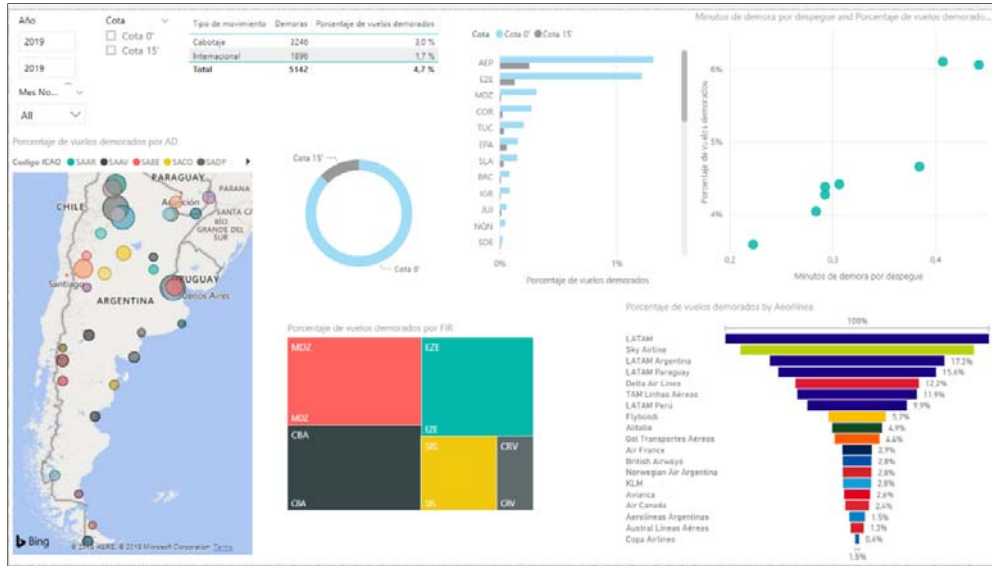


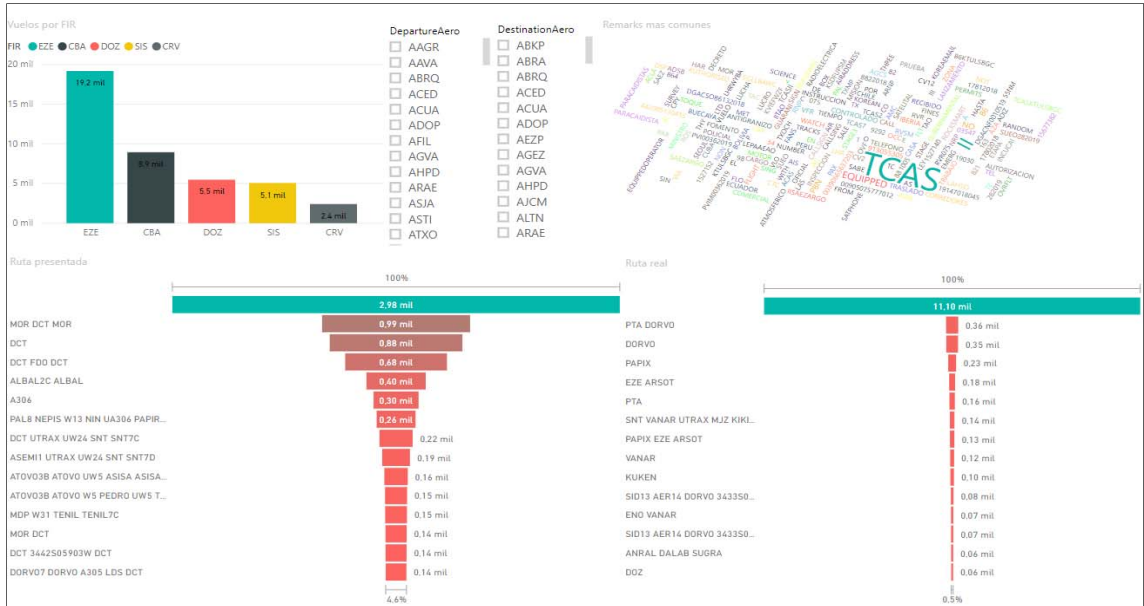
Image 1

2.3 AIRCOM (INDRA) data. - Since assuming service provision, work started on each separate file entitled “Billing”, showing, for each FIR, the development of each flight plan, and crossing of reporting points, with the respective flight schedule and level.

2.3.1 In January 2018, work started on data received from the remaining interfaces of the AIRCON (INDRA) system. This data is shown in plain text, variable-length format.

2.3.2 Based on this, the project was started in order to: 1) receive all files automatically, on a daily basis; 2) convert plain text into a database; 3) create a decentralised database with files containing radar information from all over the country; 4) create a database of aeronautical messages sent.

2.3.3 So far, one month of information has been processed, based on which a test dashboard was developed to display the information contained in the files.



Image

It shows flight plans by FIR, routes used by origin/destination, and the most frequent remarks.

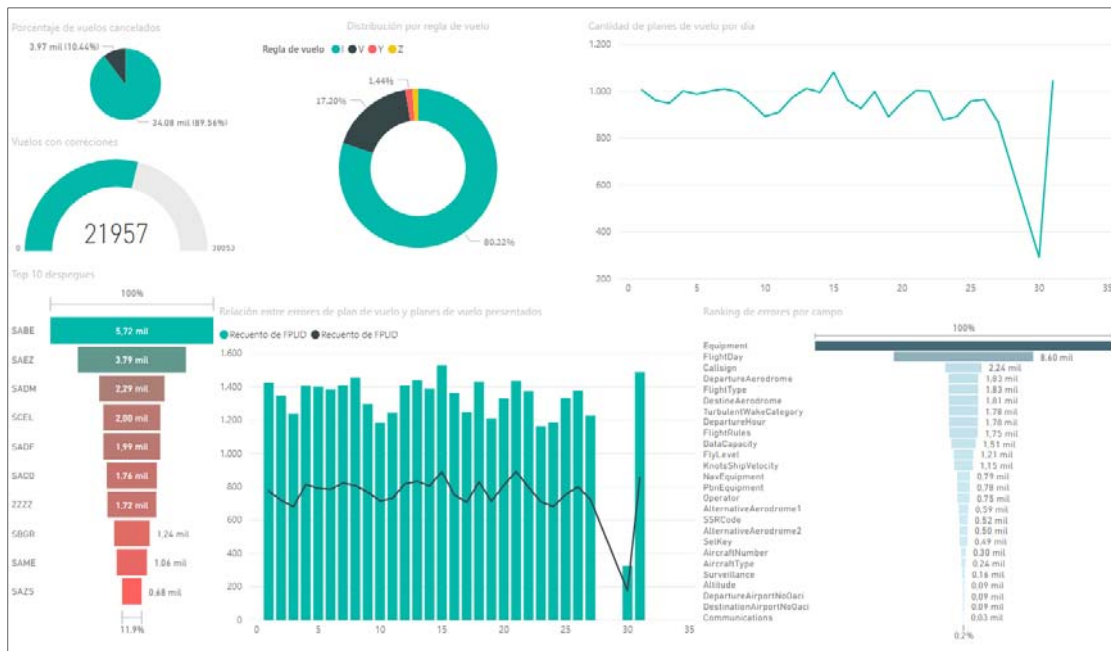


Image 3

It also shows the number of flight plans containing errors, most common errors in flight plans, number of flight plan messages received per day, number of flights by flight rule, and percentage of cancelled flights.

2.3.4 Once that described in 2.3 has been completed, new operational indicators will be established. In addition to those included in SAM/IG/22-WP/19, the following indicators were proposed:

2.3.4.1 Direct: will be generated with no need for data conversion.

- **Number of flight plans filed:** total number of individual flight plans. Can be broken down by day, week, month, or year.
- **Repeated transmission of flight plans:** number of times that the same flight plan is transmitted/filed. Total number of repeated flight plans/number of unrepeated flight plans.
- **% of flight plans with DLA:** percentage showing the number of flights requesting rescheduling. The number of flight plans divided by the total number of flight plans.
- **% of corrected flight plans:** ratio of corrected flight plans to total number of flight plans filed.
- **% of error by field:** number of times a field was entered with errors, divided by the total number of times the field was completed. Helps to determine what fields show more errors and cannot be entered into AIRCON without being modified.
- **% of flight plans cancelled:** percentage of flights with cancellation message with respect to the total number of flights.
- **% of flight plans not activated:** percentage of flights that filed flight plans, but were never flown, with respect to the total number of flight plans filed.
- **% of sector usage, by FIR:** proportion of traffic by sector in each FIR.
- **Time in advance that the flight plan is filed:** the difference between the filing time and the off-block time requested.
- **Sanitary flights, by airport/FIR:** number of sanitary flights by airport or FIR with respect to the total number of flights.
- **% of arrival messages:** number of arrival messages versus landings performed.
- **% of departure messages:** number of departure messages versus take-offs performed.
- **% of change messages:** ratio of change messages to total flight plans.
- **STCA (short-term conflict alert) prediction:** type of STCA prediction and its relationship with total flights.
- **STCA (short-term conflict alert) violation:** type of STCA violation and its relationship with total flights.
- **% STCA violation/prediction:** number of STCA violations / STCA predictions.
- **MTCA (medium-term conflict alert) prediction:** type of MTCA and its relationship with total flights.
- **MTCA (medium-term conflict alert) violation:** type of MTCA violation and its relationship with total flights.
- **% MTCA violation/prediction:** number of MTCA violations / MTCA predictions.
- **MSAW (minimum safe altitude warning) prediction:** type of MSAW prediction and its relationship with total flights.
- **MSAW (minimum safe altitude warning) violation:** type of MSAW violation and its relationship with total flights.
- **% violation/prediction de MSAW:** number of MSAW violations / MSAW predictions

- **APW (airborne proximity warning) prediction:** type of APW prediction and its relationship with total flights.
- **APW (airborne proximity warning) violation:** type of APW violation and its relationship with total flights.
- **% APW violation/prediction:** number of APW violations / APW predictions.

2.3.4.2 Indirect: their calculation will require the conversion of one or more of their variables:

- **Distance travelled by the landed flight / Schedule efficiency** (with a radius of 55/150 NM around the airport): times between the 55NM-ring points and those corresponding to 150 NM.
- **Flight distance / Time efficiency:** this KPI helps to identify inefficiencies in terminal airspace and their causes.
- **Flight level efficiency (climb):** This is the main way to identify continuous climb operations and allows for monitoring of ANSPs to seek benefits from new procedures.
- **Flown distance:** analyses the distance between reporting points and identifies variations in routes selected for the same origin-destination. It also helps to calculate fuel consumption.
- **Direct route extension:** time between 55NM-ring points and the ones corresponding to 150 NM.
- **Variation of flight plan / route:** measures the consistency of the last pre-departure flight plan for a given flight population.
- **Variation of the flight plan / flight level:** measures the consistency of the last pre-departure flight plan for a given flight population.
- **In-flight delays:** variation of flight duration by origin-destination.
- **Flight level efficiency (descent):** This is the main way to identify continuous descent operations and allows for monitoring of ANSPs to seek benefits from new procedures.

2.3.4.3 The progress made by the project since SAM/IG/22-WP/19 is as follows:

- Automatic reception of all files, on a daily basis: 100% complete
- Conversion of plain text to database: Not started yet
 - Creation of centralised database with files containing radar information from all over the country: Validation of development. 90% complete
- Creation of a database of aeronautical messages sent: Not started yet

2.4 Other dashboards

2.4.1 Usage of runway ends, by airport

2.4.1.1 Work is underway on a dashboard to show usage of ends, by airport and period, as well as the number of tower overflights and IFR flights recorded.

2.4.1.2 The purpose is to supplement the information currently being obtained from SIAC to have a full picture of the reality in each airport.

2.4.1.3 Data is captured in the “ATS form” developed by the statistics unit, in which each airport records its movements by day and time, as well as tower overflights and usage of each end (currently, this

data is not being captured).

2.4.1.4 The ATS form has two versions, one in Excel and the other on line. Each airport uses the one that best suits its possibilities (mainly internet connection). At present, the dashboard shows information captured in the web form. Work is underway to include data captured in the Excel form.

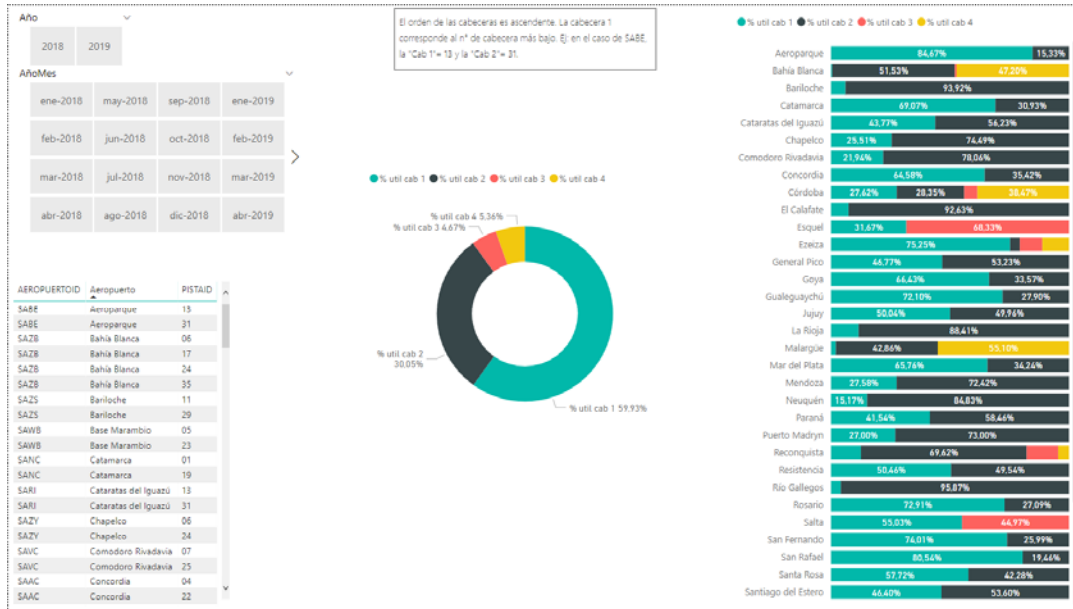


Image 4

2.4.2 Holdings dashboard – Baires TMA

2.4.2.1 A dashboard was developed to display the HOLDS to the Baires TMA. It is fed by data manually uploaded at the Ezeiza FMU.

2.4.2.2 This information is to be automated through INDRA, in order to have more data available and improve the thoroughness of the dashboard.

2.4.2.3 It shows information on holds from different perspectives, namely: by reporting point, by flight level, by airline, *inter alia*.

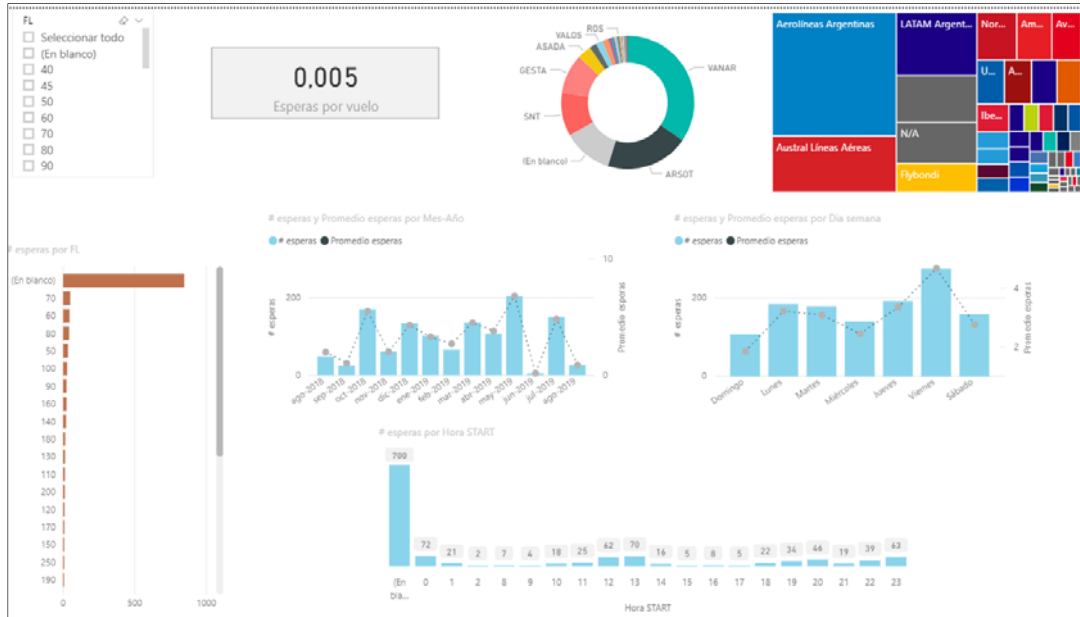


Image 5

It is also possible to see actual movements and compare them with scheduled movements, and with the maximum, feasible capacity of the sector.

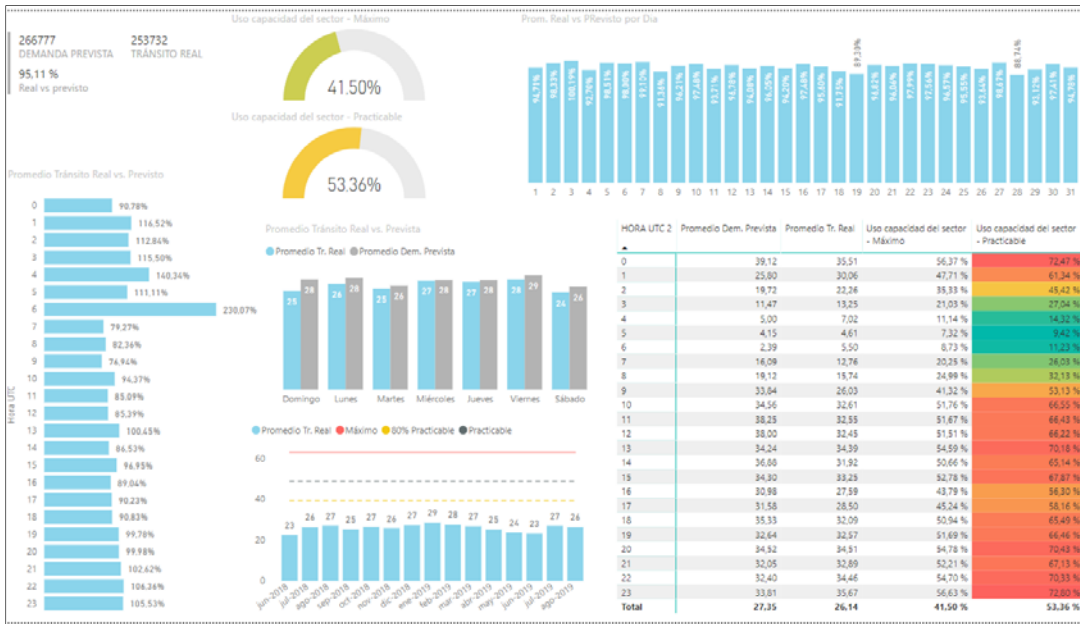


Image 6

2.4.3 Dashboard on airport status

2.4.3.1 Its purpose is to give an overview of each airport easily available to EANA staff. The data it provides includes: total and average number of movements per moving year, slot opening and slot change schedules, rerouting to navigation charts, condition and number of radio aids, staffing, number of PBN implementations, approach minima, investments, number of commercial flights scheduled per day,

historical meteorological data, *inter alia*.

2.4.3.2 The dashboard can be updated each month, and is still subject to changes or modifications.

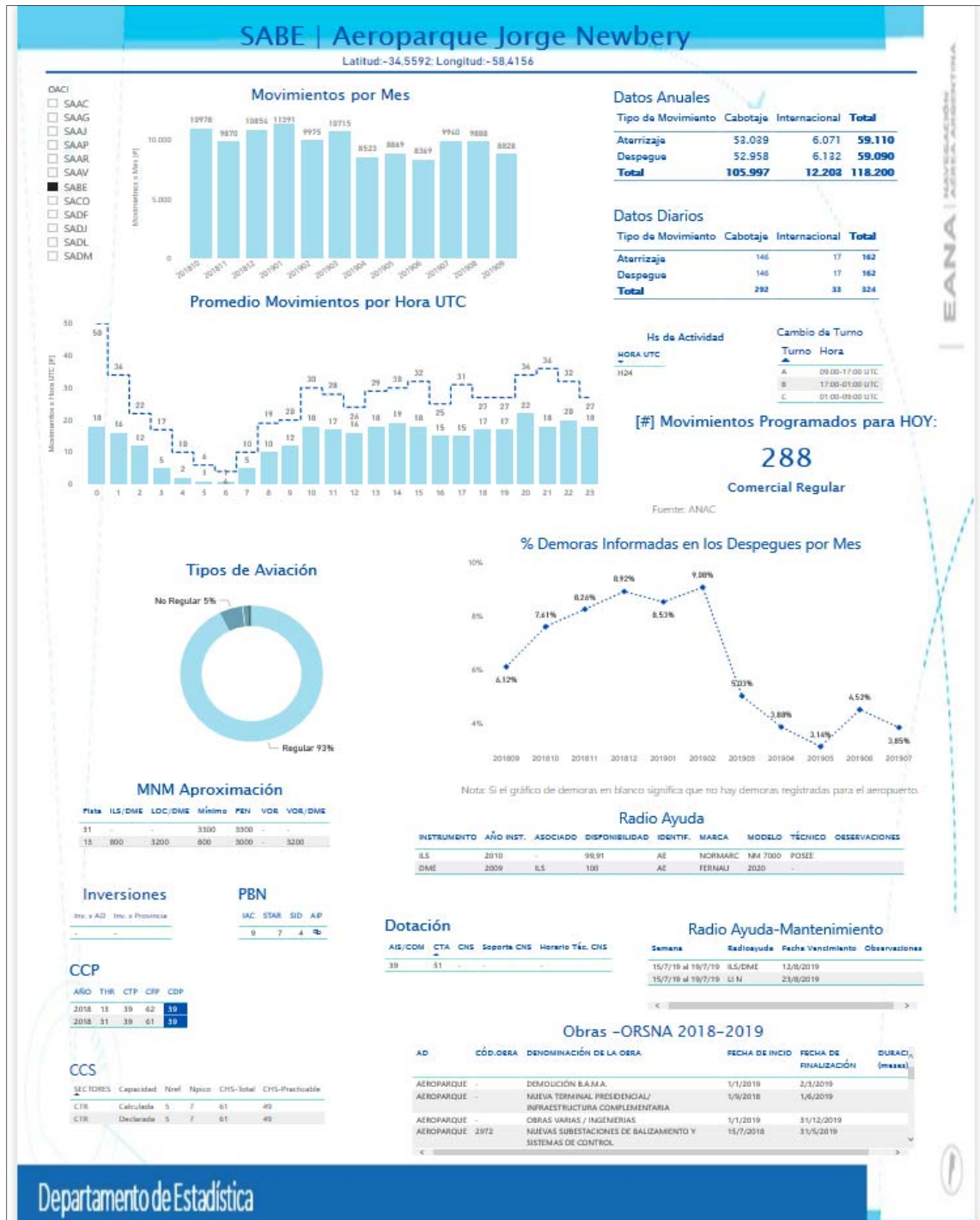


Image 7

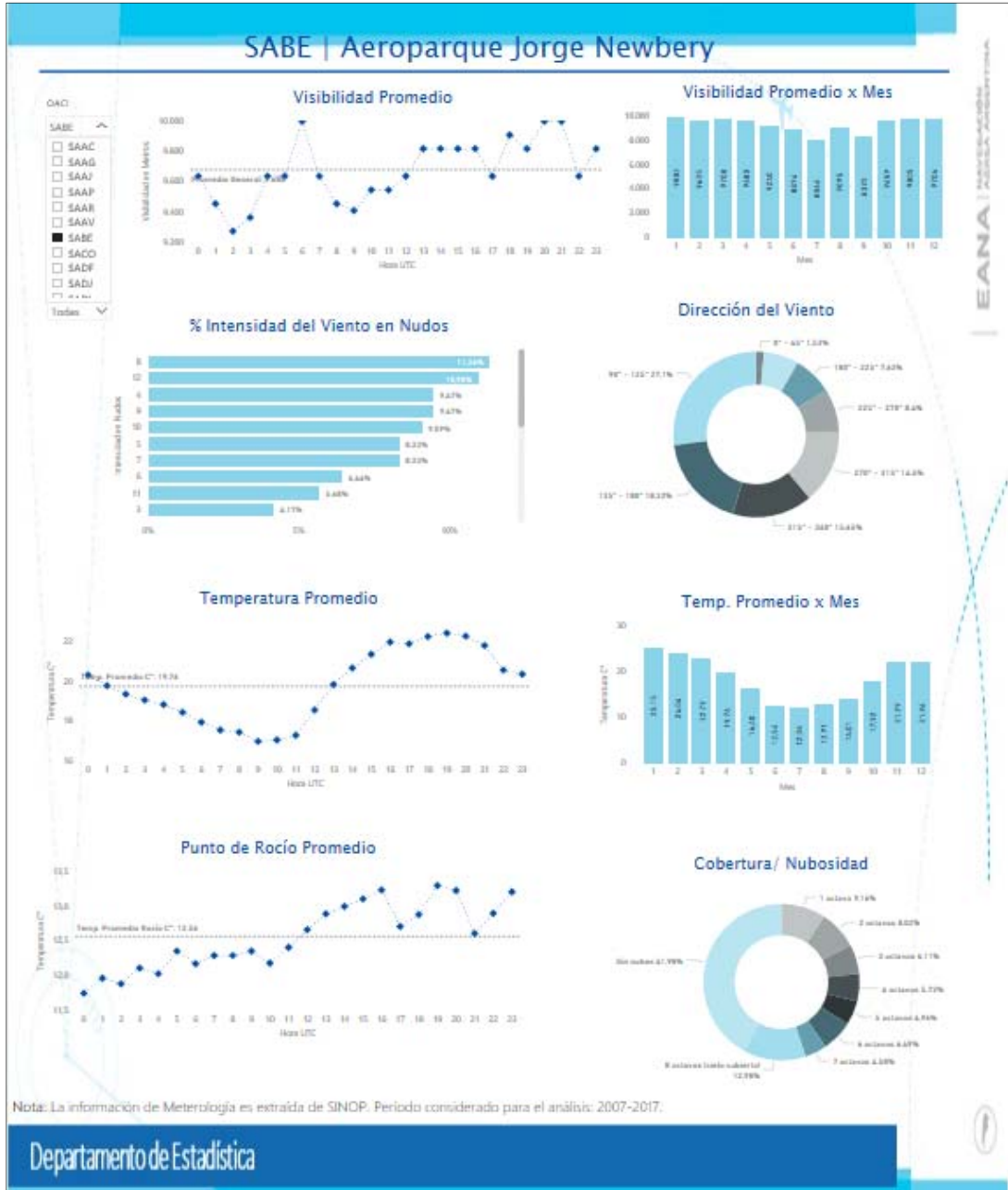


Image 8

2.5 **Meteorology:** weather reports are prepared for the different airports to support decision-making by the various areas regarding the purchase of equipment and the development of new approach procedures. Data covers, mainly, visibility, operation slot, temperature and wind. Some examples of the information so developed are shown below:

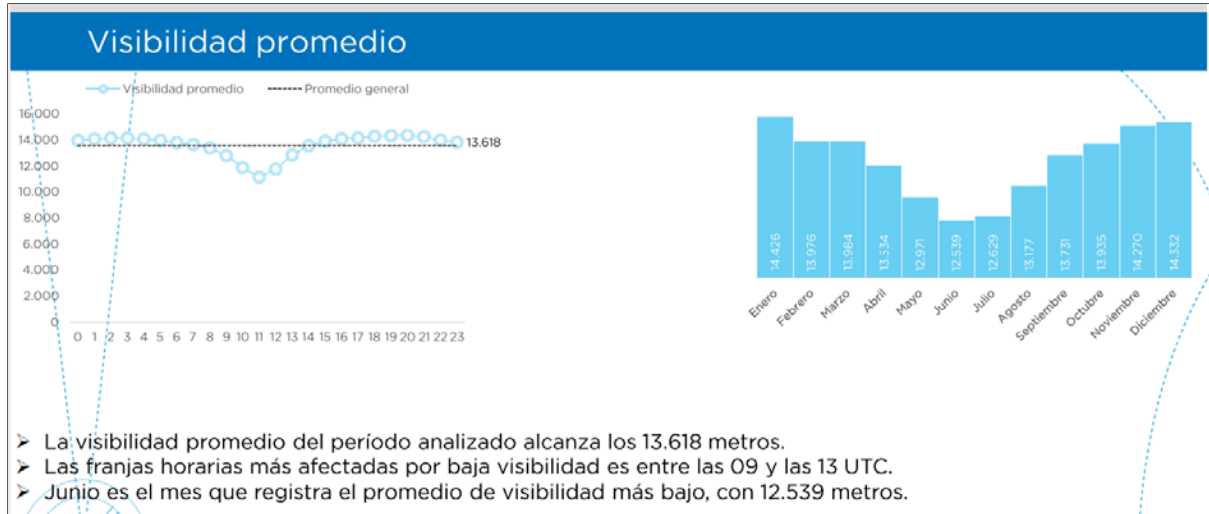


Image 9

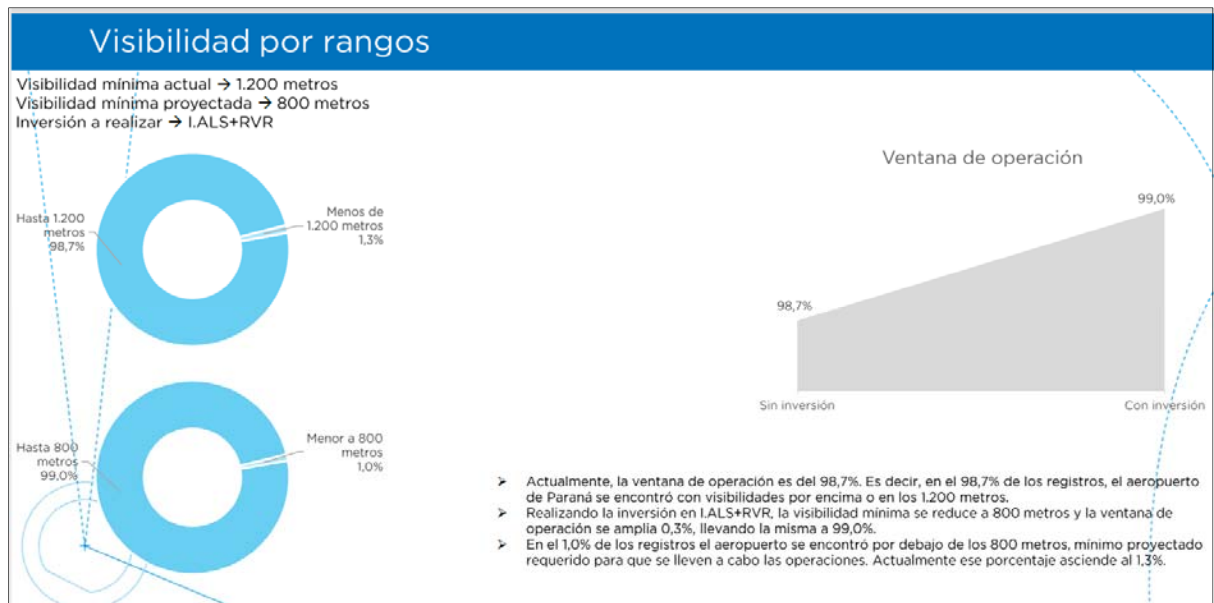


Image 10

Temperatura

Temperatura (°)	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre	General
Promedio	27,4°	27,2°	25,2°	22,5°	18,7°	16,5°	16,6°	18,7°	20,2°	22,6°	24,7°	26,5°	22,2°
Máxima	37,9°	38,7°	38,0°	35,9°	32,9°	30,9°	31,5°	35,2°	36,7°	37,6°	37,3°	39,5°	39,5°
Mínima	15,5°	15,1°	10,4°	6,9°	2,9°	0,3°	0,5°	2,1°	5,1°	10,5°	10,2°	12,2°	0,3°

Image 11

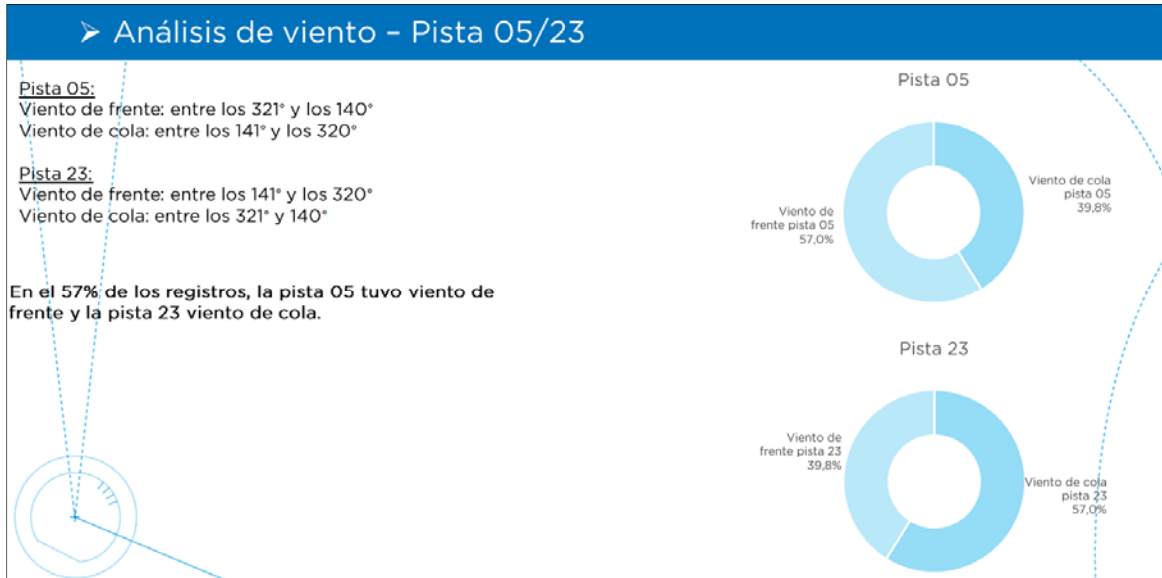


Image 12

3. **Suggested action**

3.1 The Meeting is invited to:

- a) Take note of the information provided in this working paper;
- b) propose the use of common indicators, perform feasibility studies, suggest new data capture methods;
- c) review the improvements made and measurements used; and
- d) establish common indicators and metrics in order to measure the performance of the service provided.

- END -