



Ministerio de Transporte
Argentina

Argentina unida

Module 1

Introduction to air navigation services performance measurement

EANA Argentina Experience

CAR Virtual workshop for the preparation of the CAR/SAM/ANP-VOL III

Online from 14 to 18 February 2022

EANA | NAVEGACIÓN
AÉREA ARGENTINA

Basic Considerations

The content that will be shared in this Workshop will be based on:

- Indicators workshop 2021, by Javier Puente (ICAO).
- Experience of EANA for data management.
- Global Air Navigation Plan (GANP).
- ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU)



Introduction



Performance measurement system

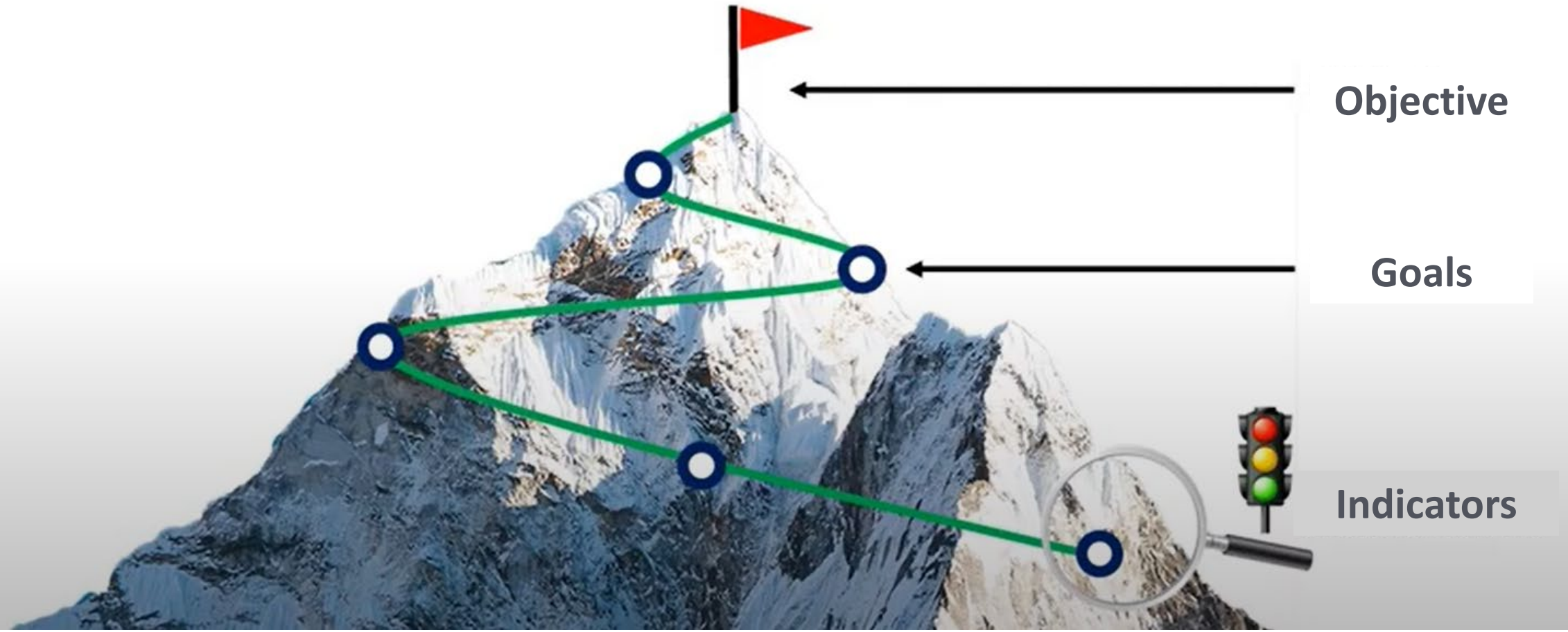
Today we have more data than ever. And we have the capacity to store and process them

- Measuring allows us to influence.
- Measuring allows us to control.
- Measuring allows us to obtain information.
- Information allows us to make better decisions.
- Measuring allows us to communicate.
- It allows us to improve.

That's why it is important to establish a **Performance Measurement System**.

Credits: This training is adapted from a course developed and provided by Javier Puente from ICAO SAM Regional Office.

Components



Strengths

To establish a good performance measurement system helps to:

- Establish a culture of data and performance within the organization.
- See progress and motivate action.
- Increase the visibility of relevant actions.
- Focus on what matters.
- Increases decision making and execution.
- Improves long-term performance consistency.
- Increases efficiency in the use of resources.
- Facilitate feedback.

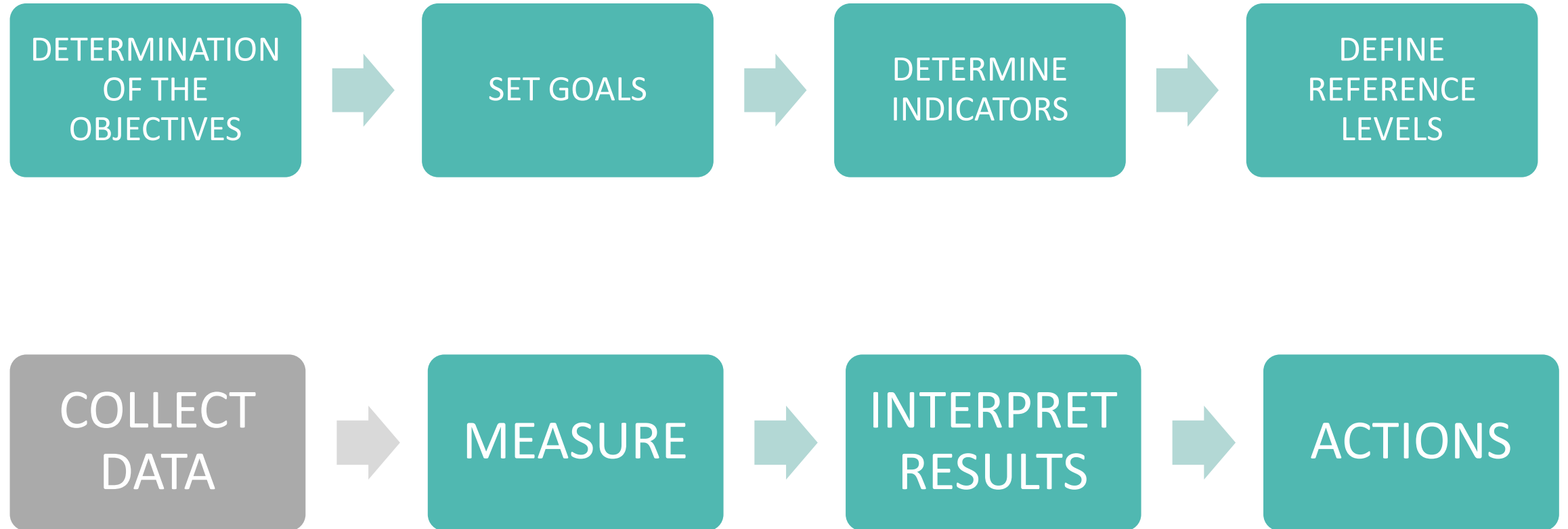


Constraints/Challenges

- There are things that we do not measure even though they are important.
- We cannot establish causal relationships. That is, cause-consequence.
- It does not guarantee, in itself, compliance with international standards and laws.
- Wrong or poorly formulated indicators result in wrong actions.



Process of 8 steps



Objectives



Objectives

Objectives are high-level statements, wishes, or a vision of what you want to achieve. They do not necessarily come to pass. They allow us to think about where I am today and where I will be when my goals are met.

The objectives are:

GENERIC

WIDE

INTANGIBLES

ABSTRACTS

HARD TO
MEASURE

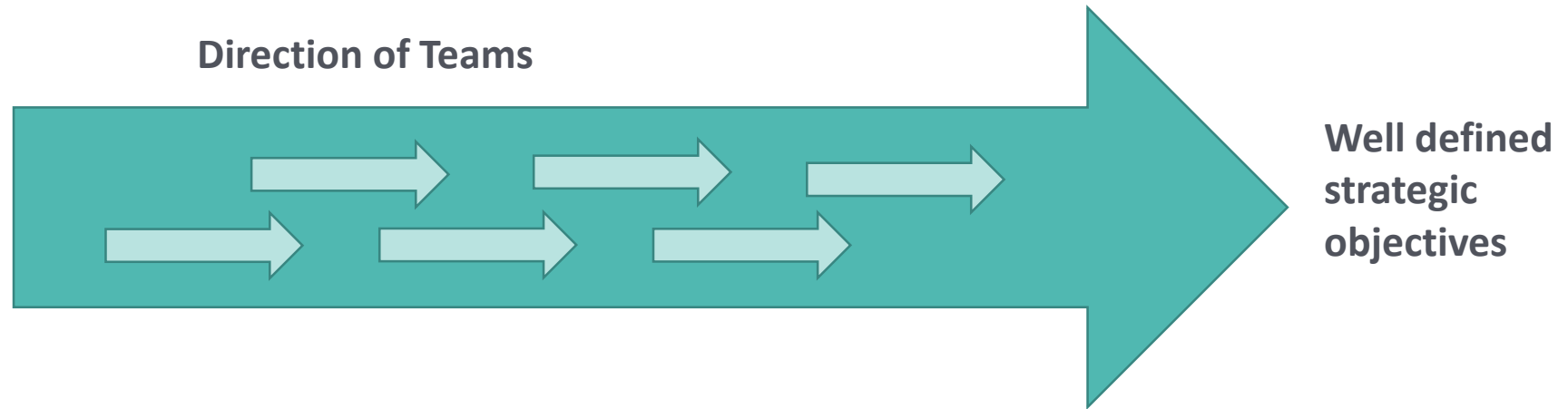
Objectives

Questions to define objectives:

- What we want to achieve?
- What is the expected change?
- Where are we today? Where will we be when we achieve the objective?



Objectives



Examples of organization objectives:

- Maintain the highest possible levels of safety.
- Foster a positive and proactive safety culture.
- Manage effectively and efficiently.

Objectives

Example of objectives in aeronautical organizations

- <<Ensure the connectivity within Argentina and globally>>
- <<Optimize resources to improve the cost effectiveness of the company. Provide a public service at the lowest possible cost>>
- <<Provide air navigation services to meet the needs of customers and society as a whole>>
- <<Comply with international civil aviation standards>>
- <<Establish and implement a sustainable safety oversight system>>
- <<Accelerate digital transformation of the aviation industry>>
- <<Modernize air traffic services>>

Objectives

- Do you know the objectives of your organization/area?
- Does your organization have a strategic plan?



Objectives

For the correct definition of an objective, this must be:

- Meaningful.
- Individual.
- Valuable to influence.
- Long term.



Goals

Goals

Goals are the actions that allow us to achieve our objectives. They are the necessary steps to achieve the final results. They are based on data.

The goals are:

SPECIFIC

TANGIBLES

CONCRETE

SHORT OR
MEDIUM TERM

EASY TO
MEASURE

Difference between objectives and goals

Objectives	Goals
They are means by themselves, final results	Steps to get the final results
Generic, intangibles, abstracts	Specific, tangibles and concrete
Based in ideas	Based in data
Long term	Short and medium term
Hard to measure	Easy to measure



Goals

Goals should be simple. One way to establish them is to respect this order:

- Action.
- Detail.
- Value.
- Unit of measurement.
- Deadline.

“Reduce the global mortality rate to less than 70 per 100,000 live births, by 2030”

*“Reduce the **global mortality rate** to less than 70 per 100,000 **live births**, **by 2030**”*

Action – Detail – Value – Unit of measurement –
Deadline

It must also be directly related to the objective.



Metas

S

M

A

R

T

Simple

When you read it, you should understand what it refers to. It is related to only one aspect of the target.

Measurable

It must contain a measurement criterion, that is, an unequivocal way of defining whether we have achieved it or not.

Achievable

We must know the current or reference value. And define a difference that is big enough to be significant, but small enough to be achieved.

Relevant

If we reach the mea we must be one step closer to the goal. This relationship between compliance and objective must be clear.

Time-Limited

The time reference gives us a context to determine if our progress was sufficient or not.

Indicators



Indicators

Indicators provide information about the state or condition of something. It is a notice that gives us information. It is always related to an objective and a goal. They help us better understand a state of affairs.

Indicators are:

CLEAR AND
CONCISE

REGARDING A
SUBJECT

AS GOOD AS ITS
DATA

INDICATE, BUT
NO EXPLAIN

Selection Criteria

A good indicator:

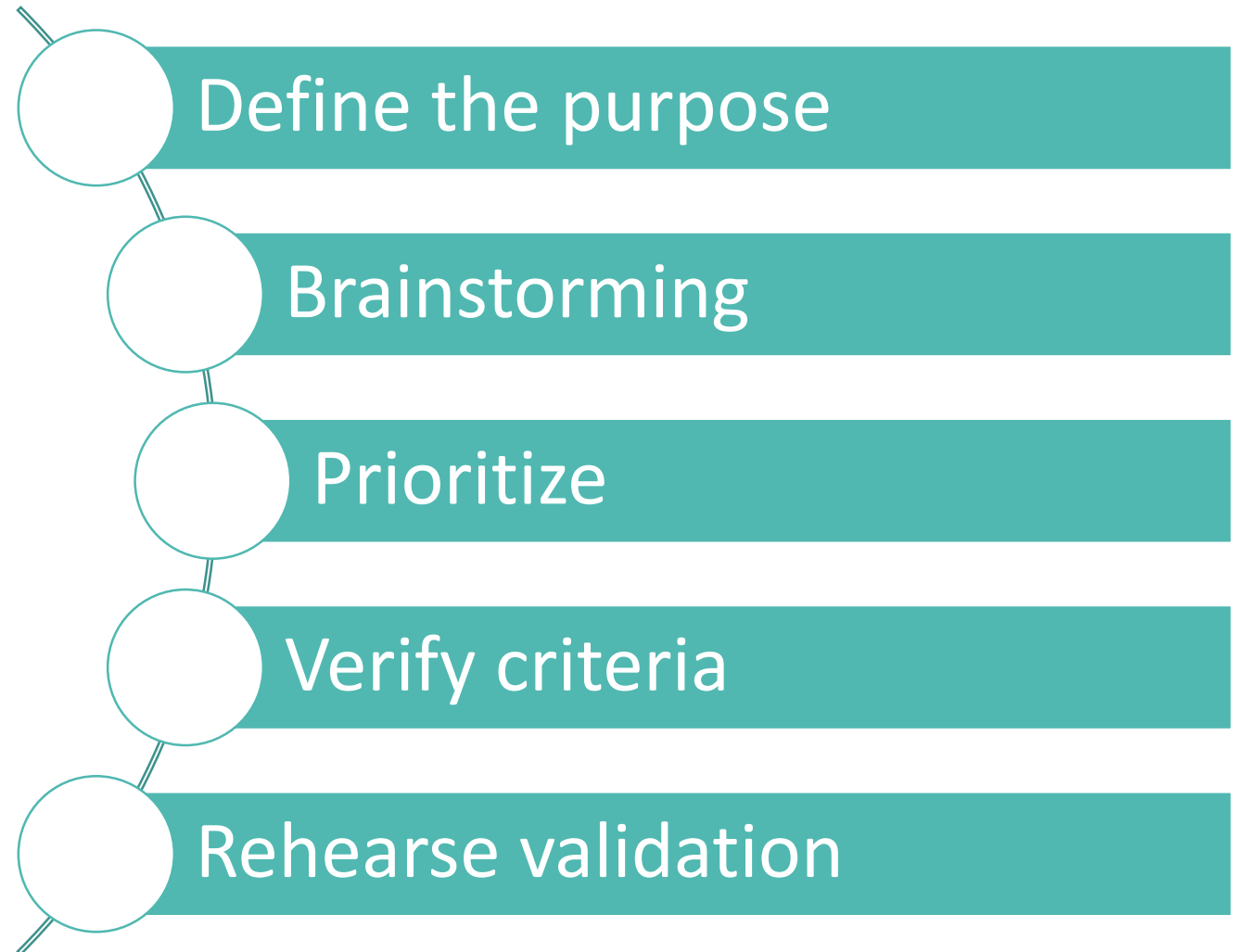
- It must be action-focused.
- Be relevant. Related to an objective and goal.
- Based on accessible information.
- Fair cost.
- It must be simple.
- Measurement unit and appropriate scales.
- Be sensitive to change.
- It must be consistent.



Steps to define an indicator

Indicators should not be built by one person, no matter how capable.

Multidisciplinary teams are the best path, as it brings a broad perspective to complex problems.



Types of indicators



Reactive

Analyze past performance. They speak about something that already happened.

- Show information about what happened.
- Easy to identify.
- Easy to measure.

They have the disadvantage that provide information when it has already happened. Difficult to influence.

Proactive

Provide information to predict future events. Indicatives of what will happen.

- Measure precursors of future events.
- Prevent unwanted effects.
- Allow to influence future events.
- Hard to measure and compare.



Reactive

EXAMPLES

- Amount of movements per month.
- Amount of errors in the drafting of flight plans.
- Nautical miles in excess en-route.
- Amount of delayed flights.

Proactive

EXAMPLES

- Amount of RVSM airspace violations.
- Percentage of aircraft with no RVSM certification.
- Number of incidents.
- Training hours.



Reference levels

Reference levels show whether the value we observe in an indicator can be defined as good, regular or bad. It is very important since our **actions** will be derived from the evaluation we make of it.

In a simple way



Axis Y: Indicator



Data



Data collection

The task is to define the necessary data and identify the available sources. This is a fundamental step in the construction of indicators. As we said, the validity of an indicator will depend on the suitability of the data that supports it.

THE QUALITY OF DATA IS GIVEN BY ITS:

AVAILABILITY

PRECISION

RELIABILITY

TEMPORALITY

SECURITY

COST-BENEFIT

Summing up

Some key aspects that can help us establish a good data culture and therefore favor performance measurement:

1. Start with the simplest.
2. Start with the most accessible.
3. Build teams by subjects. Relationship with data owners.
4. Automate as much as possible.
5. Document the process.



EANA Argentina



Sources of data



BASED ON RECORDS

SIAC

- Sistema Integrado de Aviación Civil (SIAC)
- Managed by ANAC.
- EANA S.E. AIS/COM operators input data in the log for aircraft movements.
- Monthly usage.

ATS FORM

- Managed by EANA.
- From aerodrome control towers inputs movements for type of flights, overflights and runway usage are logged.
- Daily usage.



BASED ON SYSTEMS

BILLING-INDRA

- ATM system for 5 FIRs.
- Managed by EANA.
- Flight information and usage of notification waypoints. Per each FIR.
- Information received daily but consolidated bi-weekly.

CDAE-INDRA

- ATM system for 5 FIRs.
- Managed by EANA.
- Input all the information from the ATM systems from systems logs, from flight records to AFTN
- Daily update.

EXTERNAL: Airlines, Airport service providers, National Met Services, etc



Status KPI for VOL III

KPI	NOMBRE	may-21	nov-21
KPI 01	Puntualidad en las salidas	●	●
KPI 04	Extensión en ruta del FPL presentado	●	●
KPI 05	Extensión real en ruta	●	●
KPI 09	Capacidad máxima del aeropuerto	●	●
KPI 10	Rendimiento máximo del Aeropuerto	●	●
KPI 14	Puntualidad en llegadas	●	●
KPI 15	Exactitud del tiempo de vuelo	●	●
KPI17	Nivelación en ascenso	●	●
KPI19	Nivelación en descenso	●	●

100% compliance



Dashboard - Cover



Data Sources

Descripción de fuentes de datos

Sistema ATM: Datos de gestión del tránsito aéreo (ATM) de EANA S.E. están distribuidos en cinco (5) sistemas de automatización Indra Aircon 2100 (sistemas ATM) independientes, ubicados en los ACC de Ezeiza, Córdoba, Mendoza, Resistencia y Comodoro Rivadavia.

SIAC: Sistema Integrado de Aviación Civil (SIAC) administrado por ANAC. Los operadores AIS/COM de EANA S.E. ingresan datos en el Libro de Movimientos de Aeronaves. Actualización mensual, pueden observarse demoras en la carga.

Aerolíneas Argentinas: Información elaborada y entregada a requerimiento de EANA S.E. por parte de Aerolíneas Argentinas.

AA2000: Información elaborada y entregada a requerimiento de EANA S.E. por parte de AA2000, empresa concesionaria de 35 aeropuertos del país.

FASID: Los aeropuertos argentinos que forman parte del FASID son: SAAR, SABE, SACO, SADF, SAEZ, SAME, SARE, SARI, SASA, SASJ, SAVC, SAWG, SAWH, SAZM, SAZN, SAZS

Agradecemos el trabajo en equipo, la predisposición y colaboración de:
ANAC, Aerolíneas Argentinas y Aeropuertos Argentina 2000.



KPI GANP

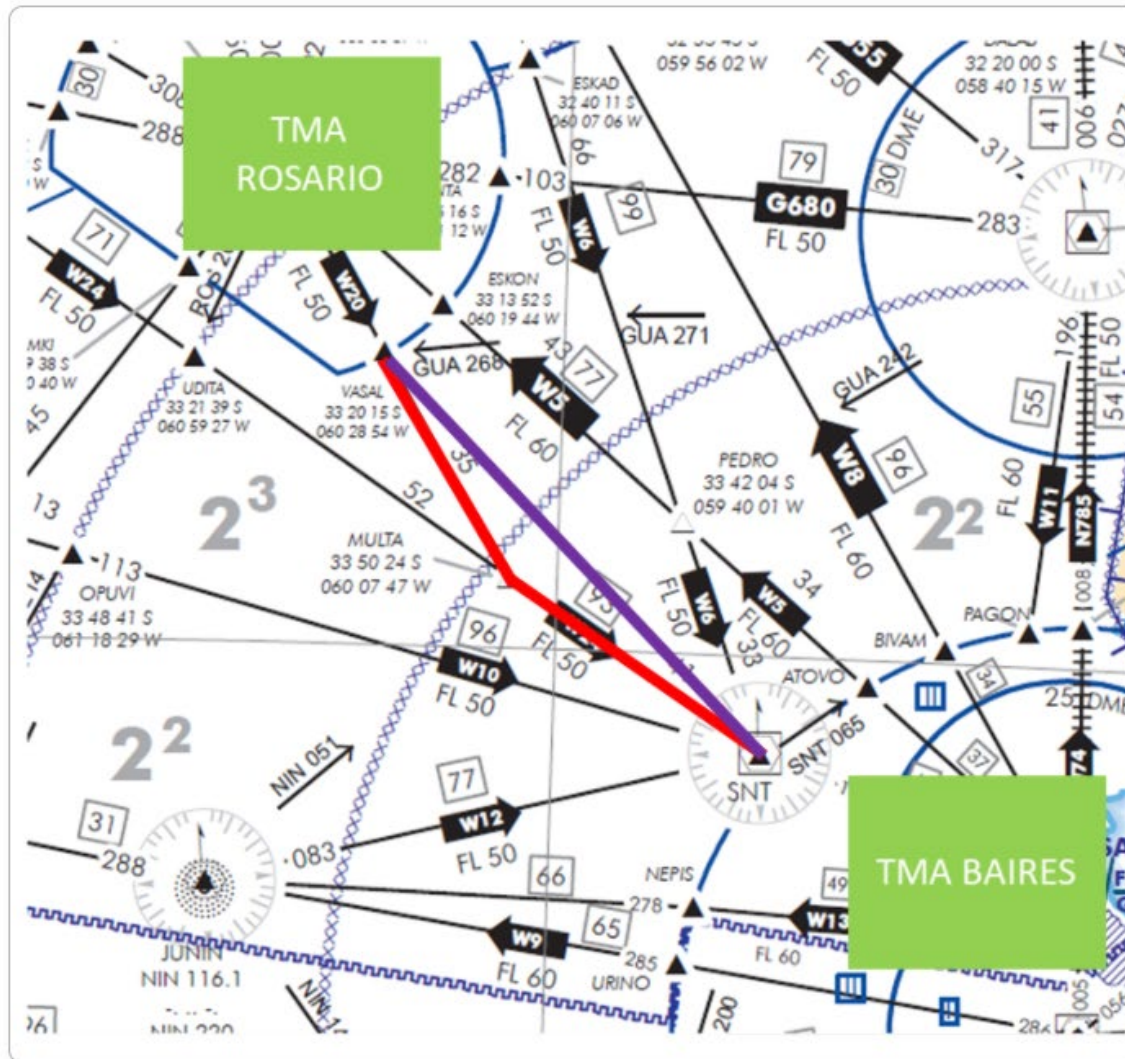
EANA | NAVEGACIÓN
AÉREA ARGENTINA

Departamento de
Estadística



Examples – KPI 04 Y 05

KPI GANP



EANA | NAVEGACIÓN AÉREA ARGENTINA



Conceptos KPI 4 - 5

En este ejemplo, consideramos un tránsito proveniente de la TMA ROSARIO hacia un aeropuerto de la TMA BAIREs.

Punto de notificación TMA (Origen):
VASAL

Punto de notificación de entrada a la TMA (Destino): SNT

Distancia real volada: Sumamos la distancia entre VASAL-MULTA más MULTA-SNT. Total 76,1 nm.

Distancia ideal: distancia lineal entre VASAL-SNT. Total: 74,3 nm.

Exceso de distancia:

$$2.42\% = ((76.1-74.3)/74.3) * 100$$

Comentarios: Para calcular las distancias se utilizó el método de Haversine.

Limite KPI 4: En caso que en el campo ruta figure la aerovía W24 y no el WP MULTA el exceso de distancia dará 0 en este caso.



Examples – KPI 10

Rendimiento máximo del AD (KPI 10 - Airport peak throughput)

Metodología: En base a los datos de SIAC, considerando la cantidad de arribos y despegues por aeropuerto, día y hora. Se obtiene el percentil 95 con las anteriores aperturas para cada aeropuerto.

Utilidad: Este KPI da una indicación de las tasas de movimiento reales en "horas pico" en un aeropuerto, registradas durante un período de tiempo determinado. Para los aeropuertos congestionados, este rendimiento es una indicación de la capacidad efectivamente realizada; para los aeropuertos no congestionados es una medida de la demanda.

Percentil 95 por AD y AÑO para el top 10 por movimientos

Año	SAAR	SABE	SACO	SADF	SAEZ	SAME	SASA	SAVC	SAZN	SAZS
2019	7	23	9	16	16	7	6	4	6	6
2020	4	19	7	13	13	6	5	3	5	6
2021	4	12	4	18	10	6	4	4	5	4

ES FASID

SI



Examples – KPI 15

Variabilidad del tiempo de vuelo (KPI 15 - Flight Time Variability)



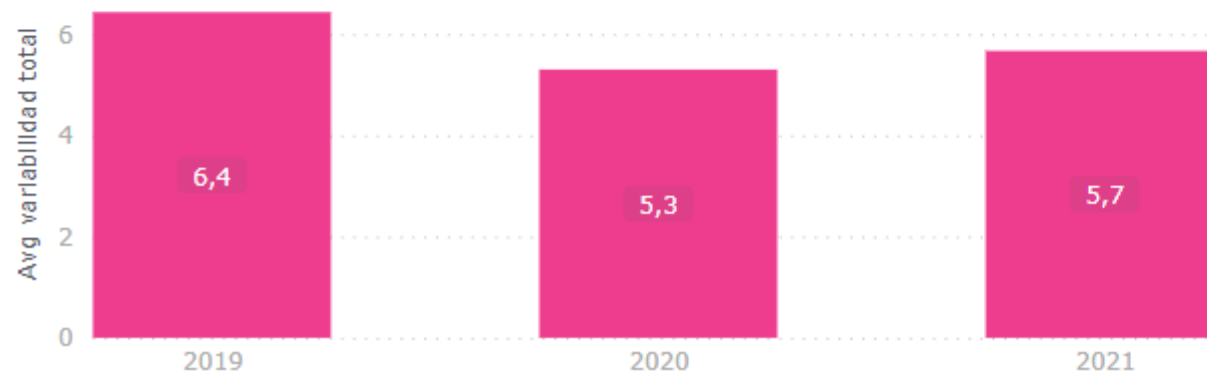
Por CITY-PAIR

Metodología: Tiempo de vuelo de todos los vuelos regulares. Para cada callsign y city pair, se registró la cantidad de vuelos, el percentil 15 y 85. Se consignó la variabilidad de tiempo de vuelo como: **(percentil 85 - percentil 15)/2**. Luego se realizó una media ponderada por cantidad de vuelos, para obtener la variabilidad total.

Utilidad: La variabilidad de las operaciones determina el nivel de previsibilidad para los usuarios del espacio aéreo y, por lo tanto, tiene un impacto en la programación de las aerolíneas. Cuanto mayor sea la variabilidad, más amplia será la distribución de los tiempos de viaje reales y más costoso será el margen de tiempo que se requiere en los horarios de las aerolíneas para mantener un nivel satisfactorio de puntualidad.

Comentarios: Se consideraron los vuelos cuyo callsign-city pair tuvieron una frecuencia anual mayor a 24 vuelos. Los datos de 2021 son acumulados hasta el momento de la última actualización.

Variabilidad por año



Next steps

- Minor adjustments, maintenance and update.
- Continuity in the joint work with the Aeronautical Authority within the framework of the working table for the development of VOL III.
- Contact with States to collaborate in the development of local methodologies.
- Analysis of GANP KPIs for future stages.



Thank you very much.



DptoPlaneamiento@eana.com.ar



DeptoEstadistica@eana.com.ar



EANA | NAVEGACIÓN
AÉREA ARGENTINA



Ministerio de Transporte
Argentina