



SIP/2009-WP/8  
Business case

# **Global ATM System**

## **~ Performance framework ~**

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**Workshop on the Development of Business Case  
for the Implementation of CNS/ATM Systems  
(Antigua, 25-29 May 2009)**

# Overview

- Performance framework
- ICAO guidance material
- Transition strategy
- Way forward

# **Performance framework -Principles**

- **Focus on results through adoption of performance objectives and targets**
- **Collaborative decision making driven by the results**
- **Reliance on facts and data for decision making**
- **Assessment of achievements is checked through a performance review, which in turn requires adequate performance measurement and data collection capabilities**

# Performance framework -Advantages

- Result oriented, transparent and promotes accountability
- Shift from prescribing solutions to specifying desired performance
- Employs quantitative and qualitative methods
- Avoids a technology driven approach
- helps decision makers to set priorities, makes the most appropriate trade-offs, and allows optimum resource allocation

# **Performance framework - Global/Regional/National**

- Transition from systems based to performance based
- What ICAO is doing:
  - Based on 11 expectations of ATM community identifying key performance areas (KPAs) such as safety, efficiency, capacity, flexibility, security etc
  - Determining metrics for safety and efficiency, such as number of fatal accidents, tonnes of fuel consumed, Number of PBN routes etc
  - Developing System performance: Communications, Navigation and Surveillance ( RCP, PBN, RSP)
- What Regions and States can do:
  - Develop Regional/National performance objective and Performance framework forms
  - Identify performance targets and measurement
  - Determine the gaps and implement projects that would meet targets

## ICAO documentation structure ...

| Document                                                  | Description                                                                                                                                                                    | Objective                                                                                                                                                                                                                                                   | Role   | Guidance                                                                                                                                                                              |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATM Operational Concept (Doc 9854) (Available on ICAONET) | The ATM Operational Concept (ATMOC) presents the ICAO vision of an integrated, harmonized global air traffic management system. The planning horizon is up to and beyond 2025. | To achieve an interoperable global air navigation system, for all users during all phases of flight, that meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements. | Vision | ATM System Requirements document (Doc 9882) (Available on ICAONET), will ensure that all ATM related standards making and industry work will be in support of the operational concept |

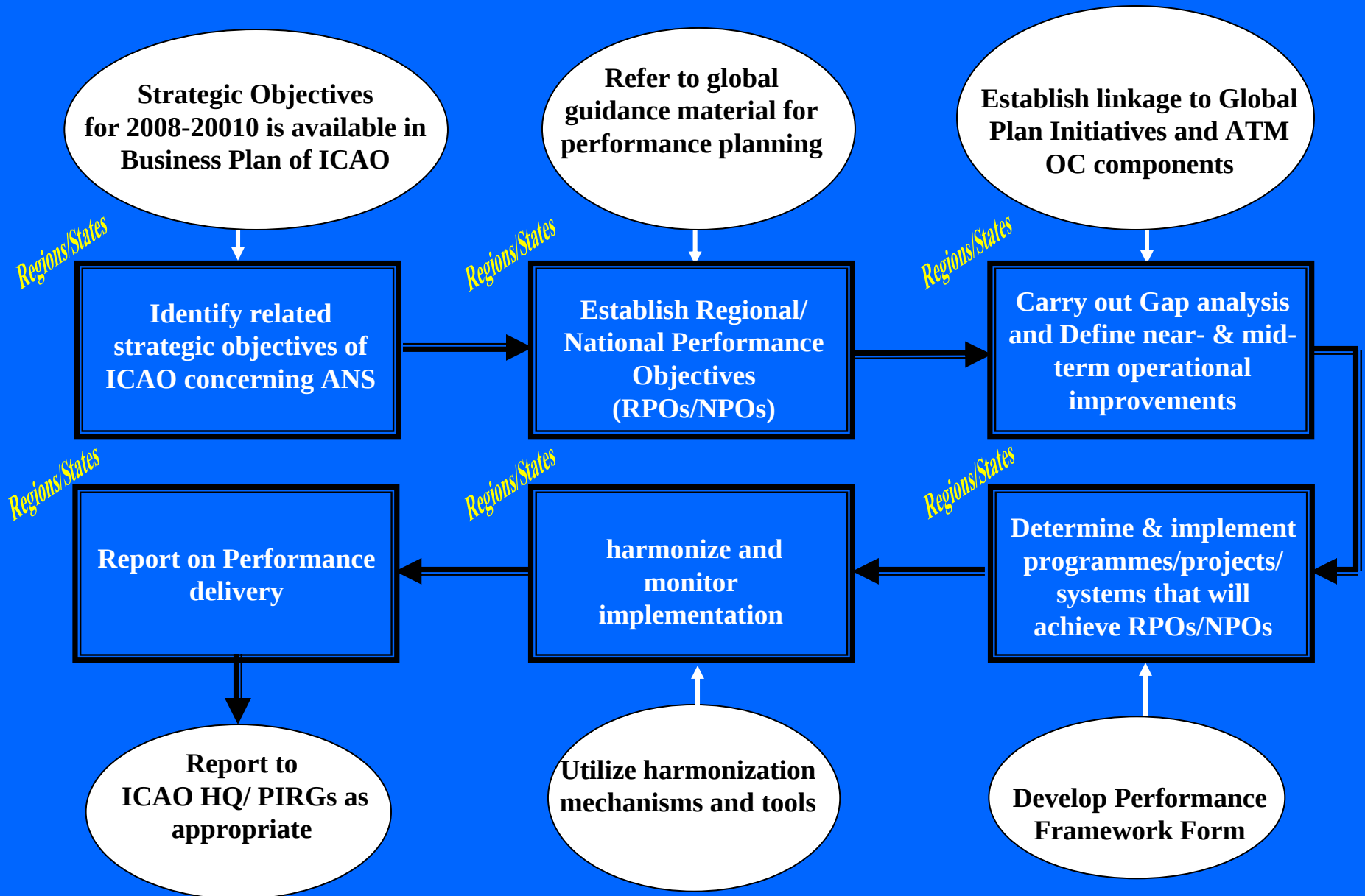
## ICAO documentation structure ...

| Document                                                           | Description                                                                                | Objective                                                   | Role     | Guidance                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Global Air Navigation Plan<br>(Doc 9750)<br>(Available on ICAONET) | Strategic document that describes the methodology for global air navigation harmonization. | Establishes the focus for near and medium term activities   | Strategy | Manual on Global Performance of the Air Navigation System (Doc 9883) (available on ICAONET). Part I provides a comprehensive understanding of the intent, expected benefits and delivery mechanisms of the performance-based air navigation system and provides guidance on measuring and evaluating ATM performance; Part II provides transition strategies and and supports the Global Plan as a transition planning document. |
| Global Plan Initiatives<br>(Part of Global Plan)                   | A set of implementation methodologies derived from operational environment                 | Measurable progress towards the implementation of the ATMOC | Tactical |                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## ICAO documentation structure

| Document                                 | Description                                                                                                                                                                                                                                 | Objective                                                                                                                                                                                                    | Role   | Guidance                                                                  |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------|
| Regional Plans<br>(Available on ICAONET) | Regional work programmes including the planning and monitoring of the detailed activities and their timelines which, inter alia, lead to the realization of a global air traffic management system as envisaged in the operational concept. | Contains the performance directives and associated requirements for facilities and services, established through regional air navigation agreements, in support of the global air navigation infrastructure. | Action | ICAO Business Plan<br>ICAO Strategic Objectives<br>(Available on ICAONET) |

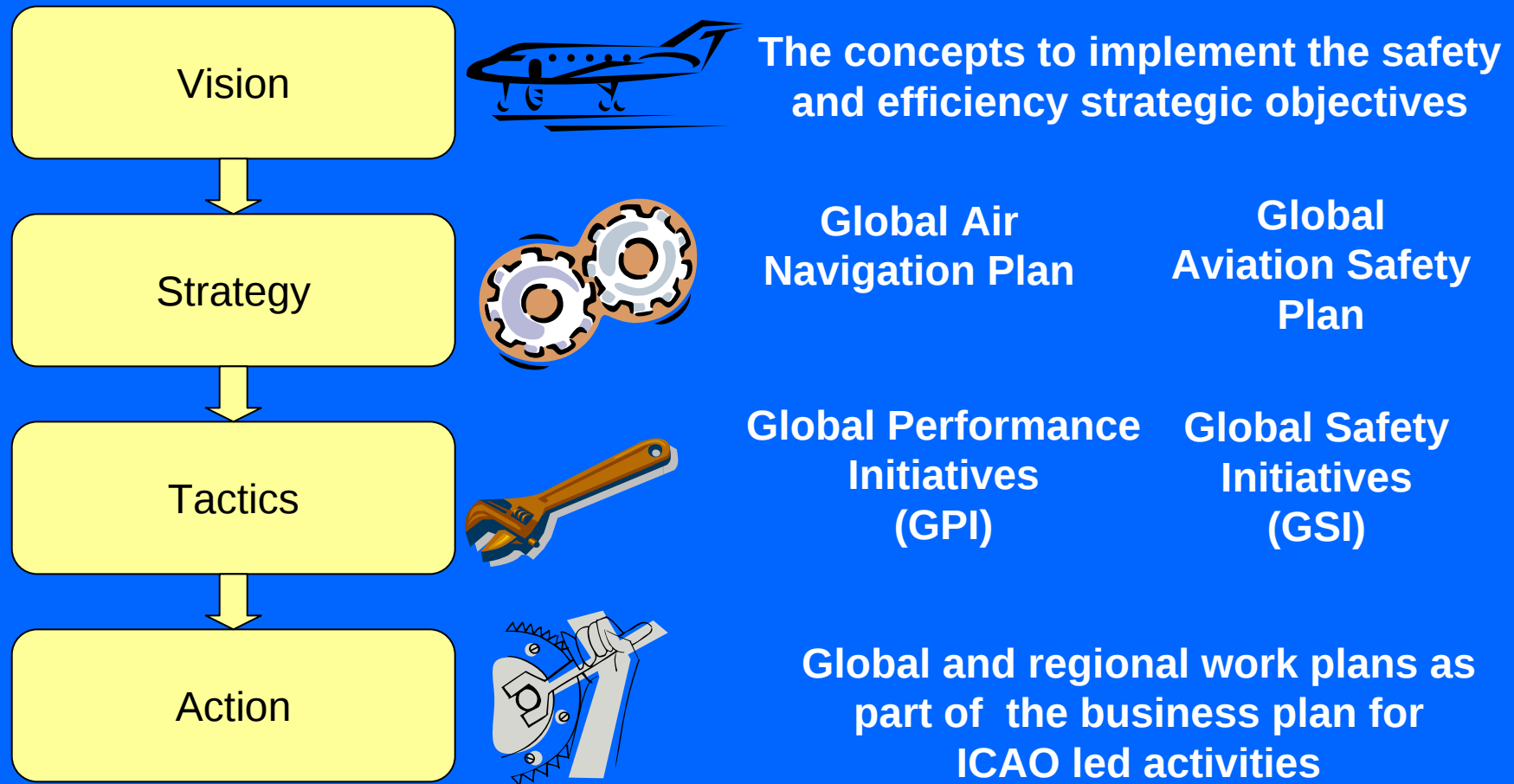
# REGIONAL/NATIONAL PERFORMANCE FRAMEWORK FOR AIR NAVIGATION SYSTEMS — PLANNING PROCESS



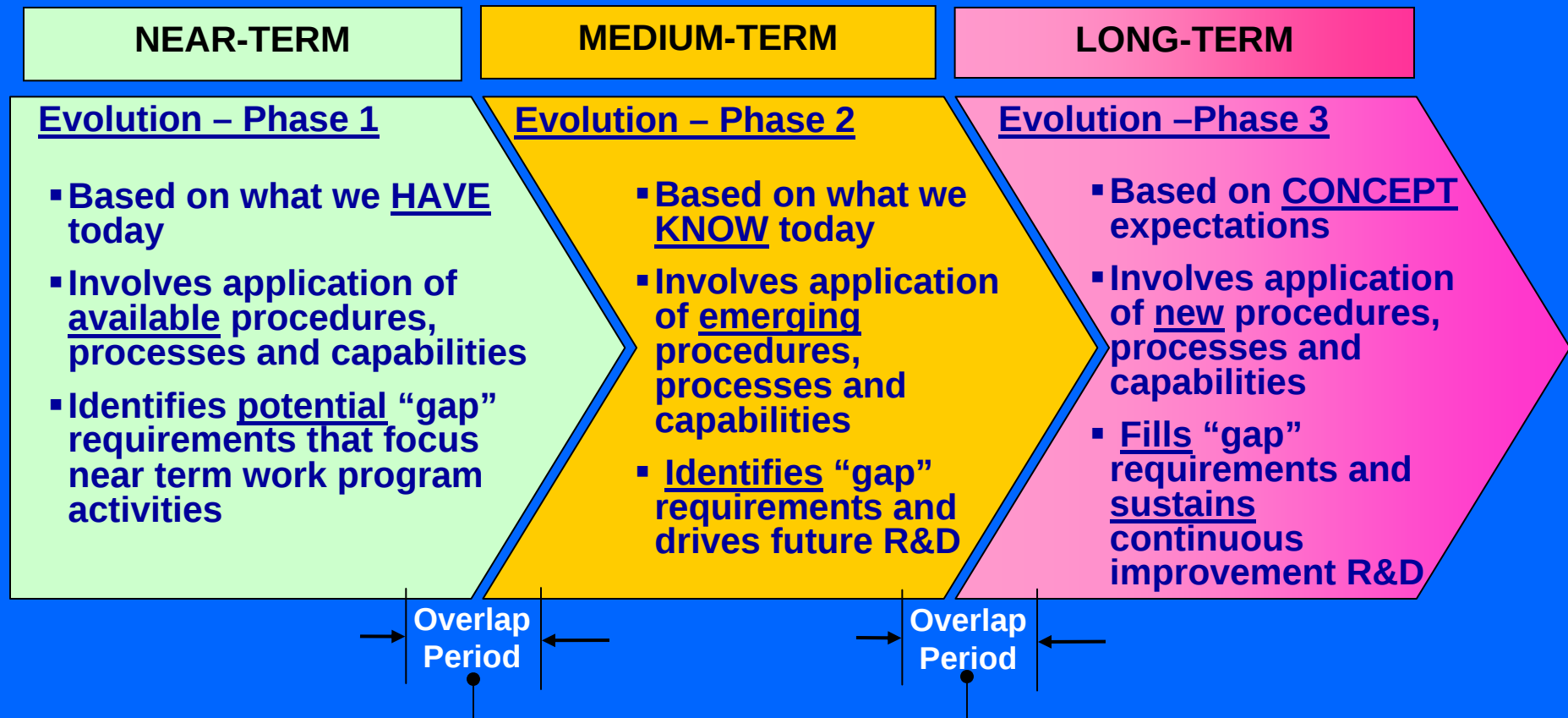
# Performance Framework Form

| <p>REGIONAL PERFORMANCE OBJECTIVES /NATIONAL PERFORMANCE OBJECTIVES —<br/>OPTIMIZE THE ATS ROUTE<br/>STRUCTURE IN EN-ROUTE AIRSPACE</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|--------|
| Benefits                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                |        |
| Environment:<br>Efficiency                                                                                                              | <ul style="list-style-type: none"> <li>•reductions in fuel consumption;</li> <li>•ability of aircraft to conduct flight more closely to preferred trajectories;</li> <li>•increase in airspace capacity;</li> <li>•facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.</li> </ul>                                                                                                                                                                                                                                                                                |                        |                |        |
| <p>Strategy<br/>Short term (2010)<br/>Medium term (2011 - 2015)</p>                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                |        |
| ATM OC<br>COMPONENTS                                                                                                                    | TASKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TIMEFRAME<br>START-END | RESPONSIBILITY | STATUS |
| AOM                                                                                                                                     | <p><i>En-route airspace</i></p> <ul style="list-style-type: none"> <li>• analyze the en-route ATS route structure and implement all identifiable improvements;</li> <li>• implement all remaining regional requirements (e.g. RNP 10 routes); and</li> <li>• finalize implementation of WGS-84</li> <li>• monitor implementation progress</li> <li>• develop a strategy and work programme to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN and, in particular, RNAV/5, taking into account interregional harmonization;</li> <li>• monitor implementation progress</li> </ul> | 2005-2008              |                |        |
| linkage to GPs                                                                                                                          | <p>GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management,<br/>GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                |        |

# The ICAO Process

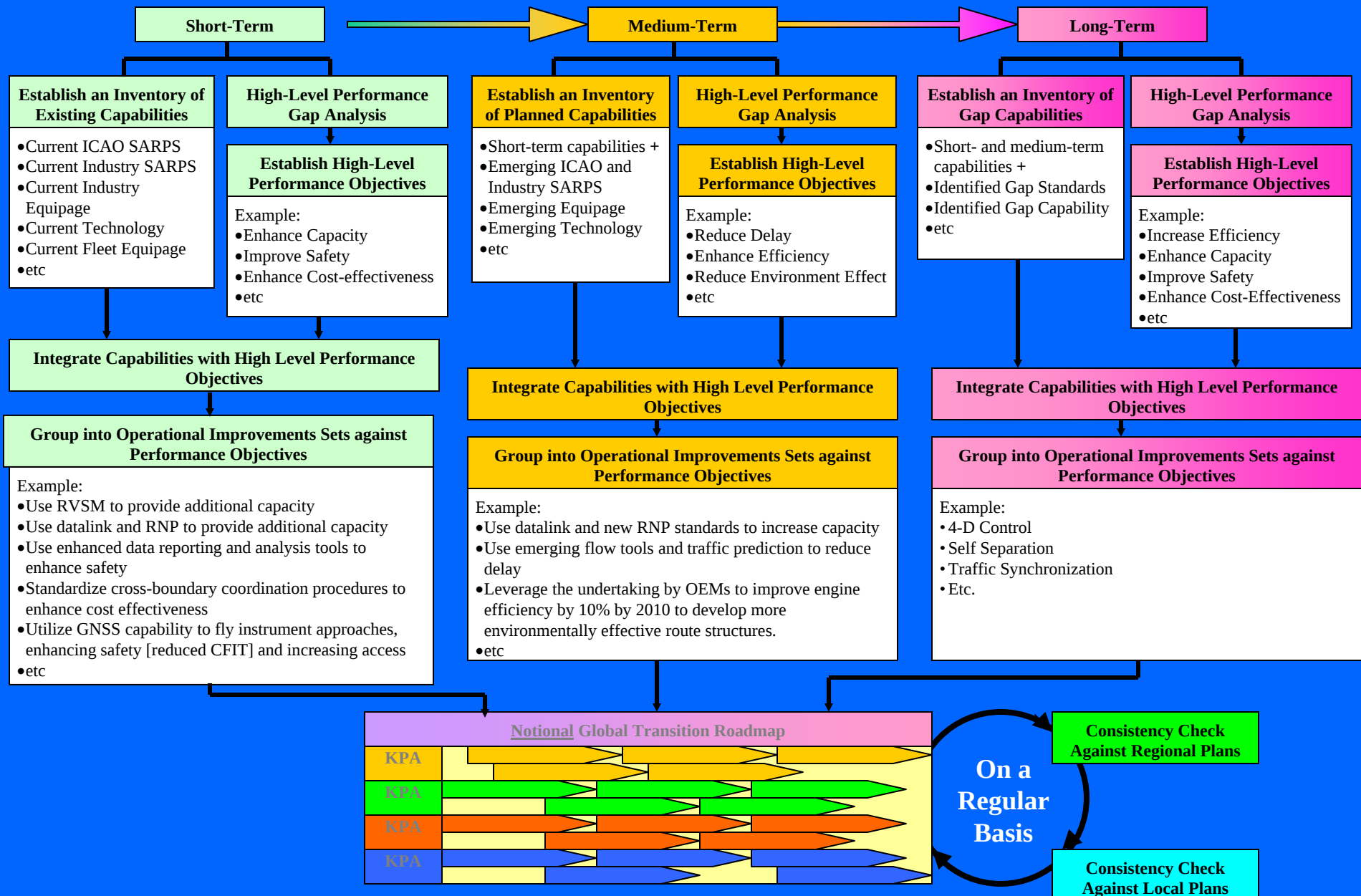


# Transition Strategy



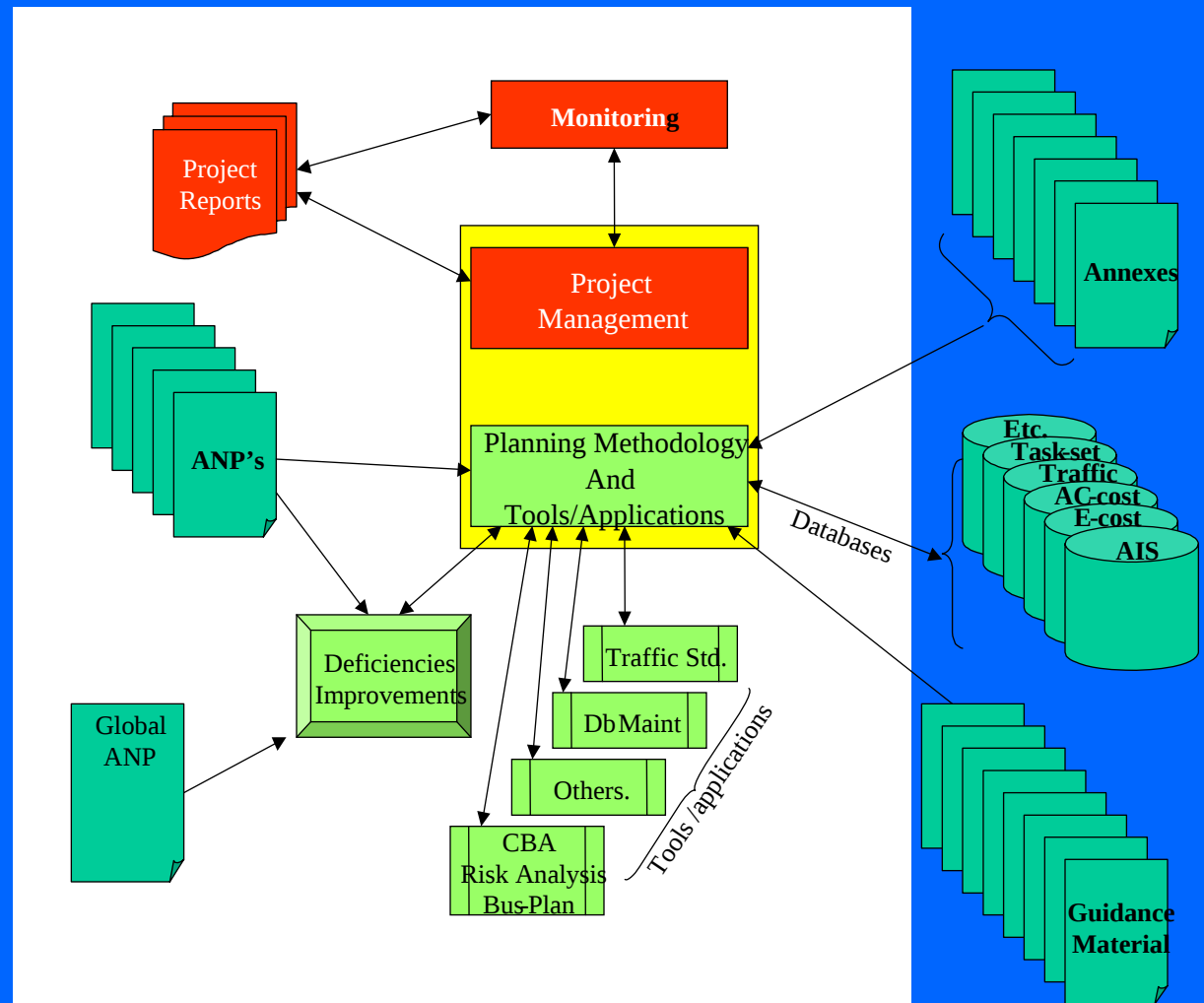
The “Overlap Period” indicates that there is no set date by which the objectives of each transition should be met – other than within a time band of perhaps 2-3 years. It also recognizes that some States or Regions may not have a specific performance requirement that would need the application of changes identified in the transition maps at the same time as another State or Region.

# Transition Roadmap



# Interactive planning

- Interactive planning tools to support implementation will require common databases with data integrity.
- A common planning methodology and business planning process should provide an efficiency synergy by allowing Regions and States to share lessons learned and reduce duplication of effort.
- implementation is still based on validated Regional requirements.



# Performance objectives – examples (1/2)

- Optimize ATS route structure in both terminal and en-route airspace (GPIs 4, 5,7,8,10,11 and 12)
  - Improve demand and capacity balancing (GPI 6)
  - Enhance civil/military coordination and cooperation (GPI 1)
  - Align upper airspace classification (GPI 4)
  - Implement vertically guided RNP approaches (GPI 5,7,8,11and 12 )
- 
- Protection of aeronautical frequency spectrum (GPI 23)
  - Enhance situational awareness ( GPI 9)
  - Improve ground-to-ground communication (GPI 22)
  - Implement advanced technologies to support data link services (GPIs 22 and 17)

# **Performance objectives – examples (2/2)**

- Improve quality and efficiency of AIS (GPIs 8 and 20)
- Implementation of new ICAO flight plan (GPI 18)
- Implementation of WGS-84 and eTod (GPI 5, 18 and 20)
  
- Enhance safety of runway operations (GPIs 13, 14 and 21)
- Implement Aerodrome certification (GPIs 13 and 14)
- Implement superior rescue and fire fighting provisions (GPI 13)
  
- Implementation of SIGMET (GPI 19)
- Implementation of QMS (GPI 19)
- Migration from alpha-numerical codes to XML(GPI 19)

# Measuring success ...

## ➤ Success of ICAO

- Business Plan and timelines

## ➤ Success of the Global air navigation system

- capacity
- efficiency
- environment
- flexibility
- interoperability
- Safety

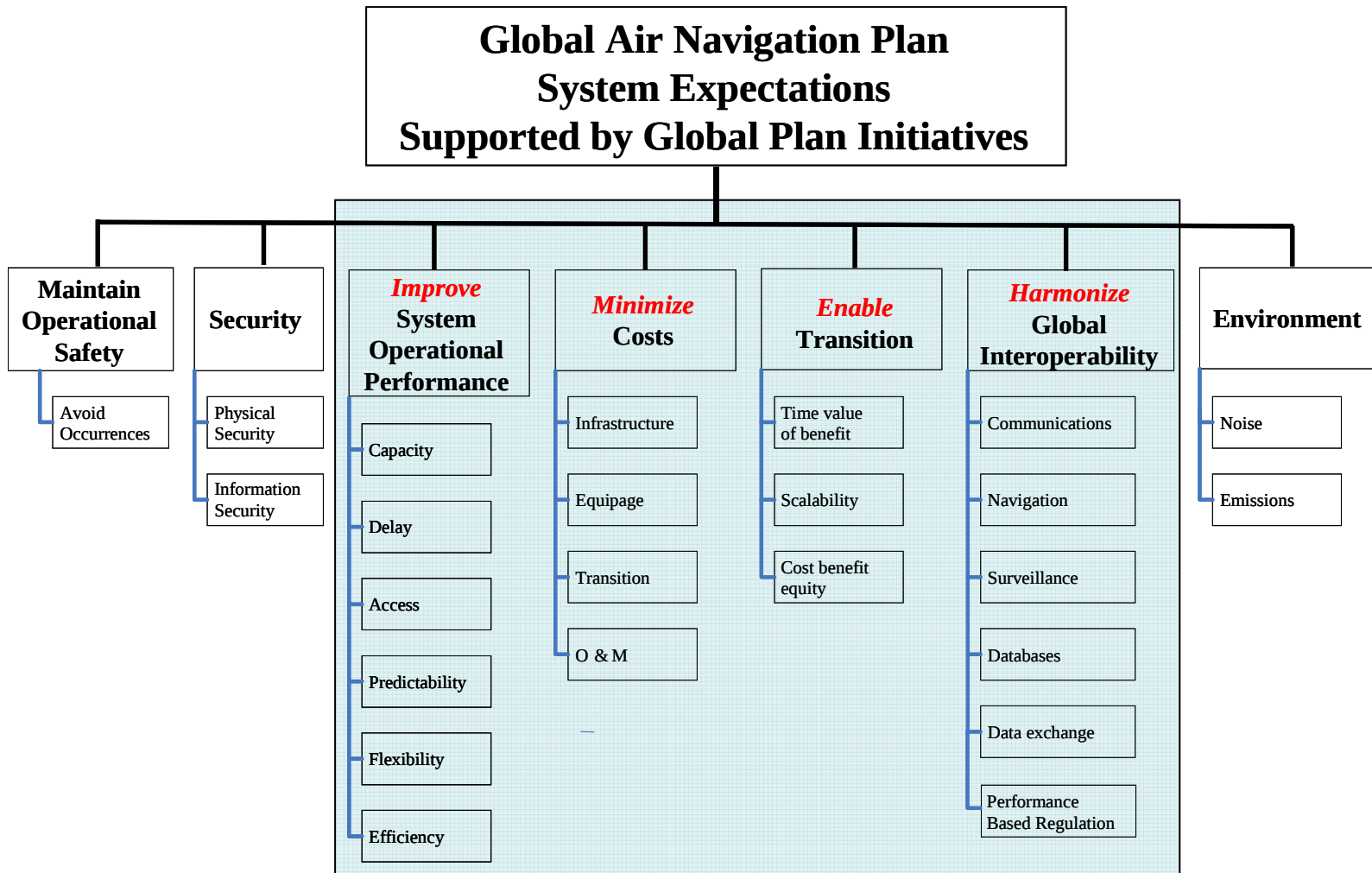
# Measuring success

- **Choosing metrics: Metrics are quantitative measure of system performance – how well the system is functioning**
  - Safety: number of accidents per 100,000 departures
  - Capacity: Air cargo- Tons per year; Air side capacity- number of ops/hour; air borne delay- minutes per flight
  - Cost effectiveness: Total operating cost plus cost of capital divided by IFR flights
  - Efficiency 1: Estimated fuel savings (based on year 2000 as baseline)
  - Efficiency 2: Number of PBN routes/Number of APV approaches to runway ends
  - Environment: CO<sub>2</sub> burn
- **GREPECAS to choose appropriate 5 to 6 metrics**
- **GREPECAS to call upon States to provide requisite data to Regional office for the chosen metrics**

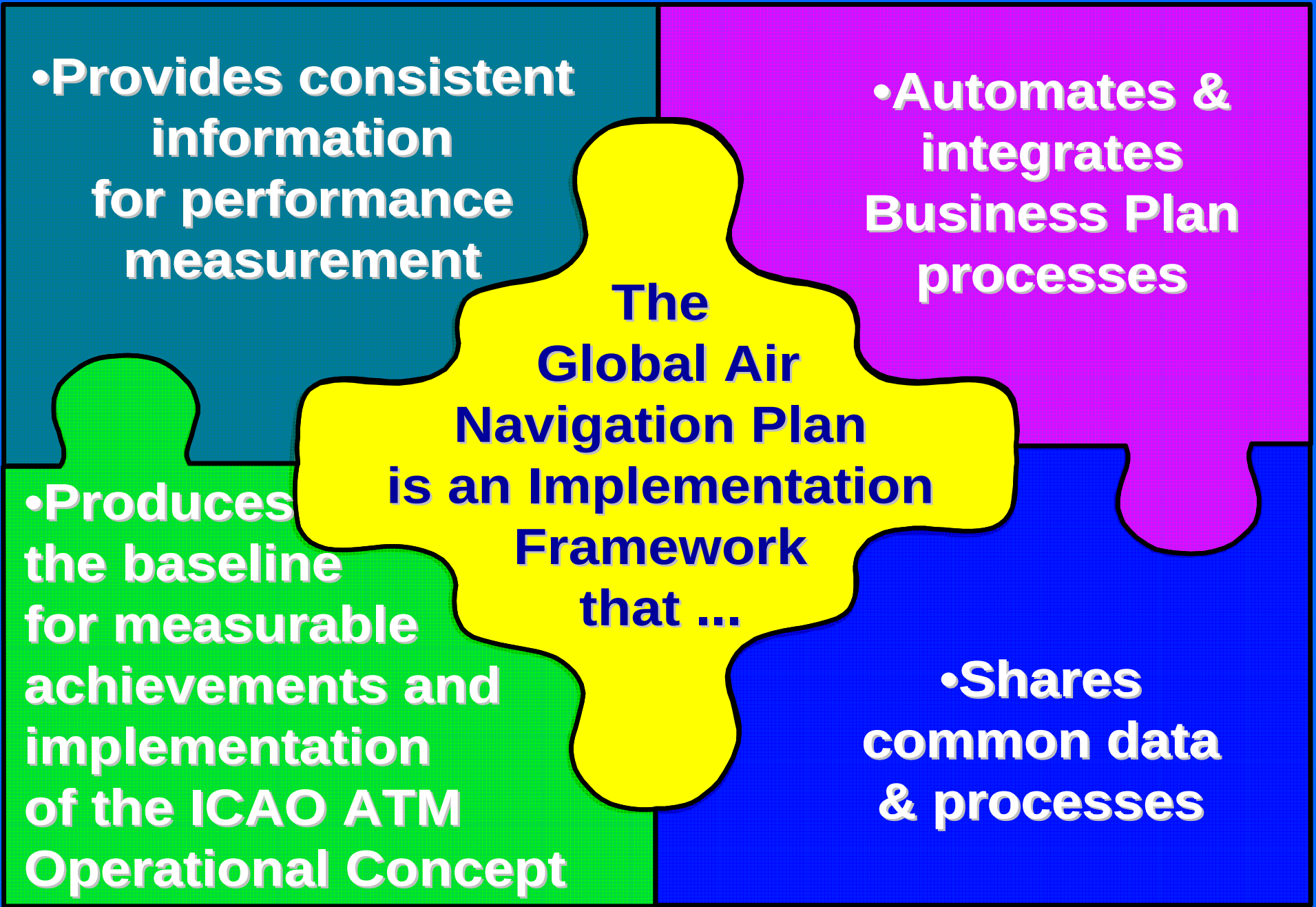
# Measuring success

- **Develop performance indicators: Use SMART approach**
  - **Specific:** The measure is unambiguous, it is tied to a single aspect and the control of the aspect ratio is well known, for instance, delay is not specific for all the reasons above.
  - **Measurable:** There is a well-defined set of values that can be gathered and for which a scale of behavior can be described. Fuel burned is measurable; flight time is measurable; flexibility is not (at least not yet).
  - **Accurate:** The measure is capable of valuing small and large variations. A meter stick is not an accurate measure of hair thickness.
  - **Reliable:** The system produces values that can be measured in all but the most extreme circumstances. Once again, delay is not a reliable measure .
  - **Timely:** One doesn't need to wait years to measure. Although retrospective analysis is good, one needs to be able to measure performance in a time equal to the period of interest. If one is interested in the previous day a measure that requires one to wait a year to capture the value is not timely

# Expectations



**Efficiency Strategic Objective Focus Areas**



- Provides consistent information for performance measurement

- Automates & integrates Business Plan processes

**The  
Global Air  
Navigation Plan  
is an Implementation  
Framework  
that ...**

- Produces the baseline for measurable achievements and implementation of the ICAO ATM Operational Concept

- Shares common data & processes

# Way forward

- Need to have a clearly defined strategy to implement ATM systems as well as align work programmes of the States, regions and ICAO Headquarters
- adopt a performance framework on the basis of ICAO guidance material and ensure their alignment with the regional performance objectives, the regional air navigation plan and the Global ATM Operational Concept
- The performance framework should include identification of regional/national performance objectives and completion of regional/national performance framework forms

# Summary

- Discussed the performance framework, its principles and advantages
- Noted transition strategy and the guidance material available in ICAO
- Recognized the way forward

**— END —**