



# **Global Air Navigation System Transition Guidelines**

**J. Nagle, Chief CNS/AIRS**  
**International Civil Aviation Organization**

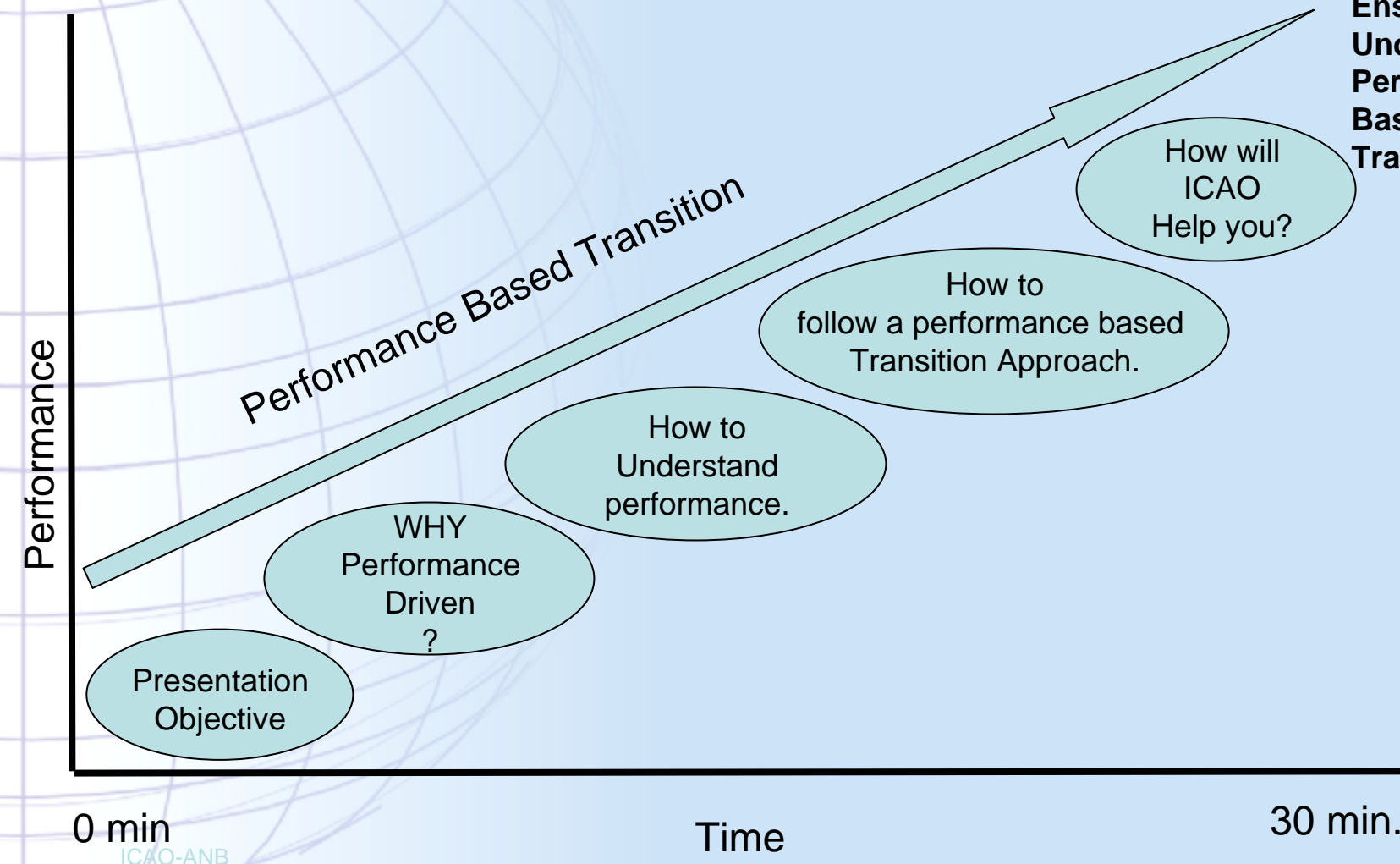
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**Workshop on the Development of  
National Performance Framework  
(Lima, 13-17 April 2009)**

# Performance Based Transition



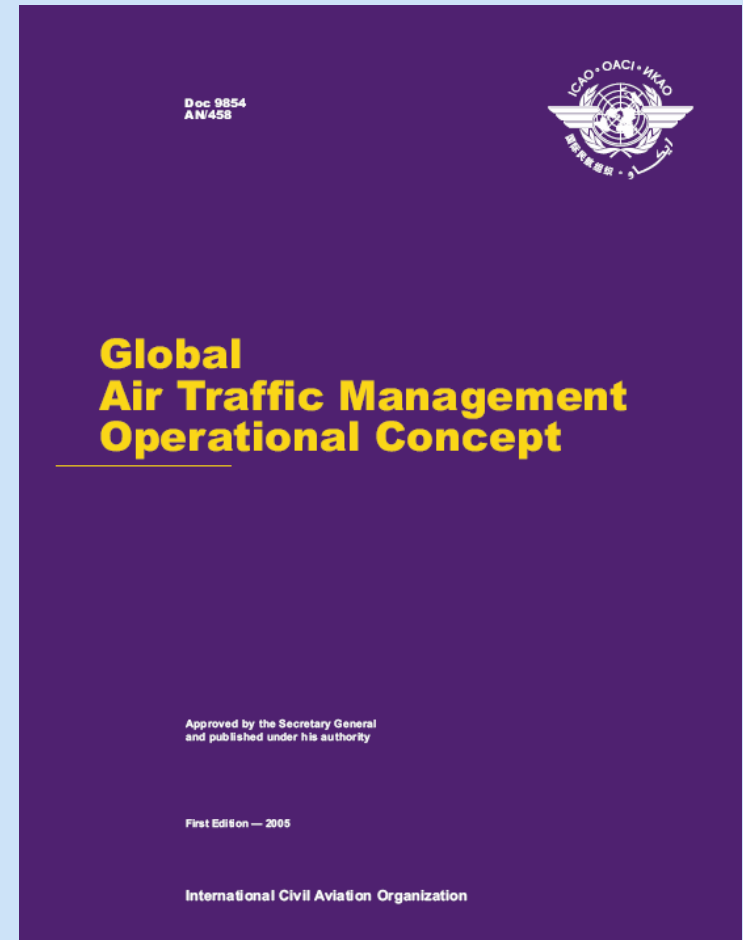
**Target Outcome:**  
Ensure audience  
Understands  
Performance  
Based  
Transition



# The Global ATM Operational Concept



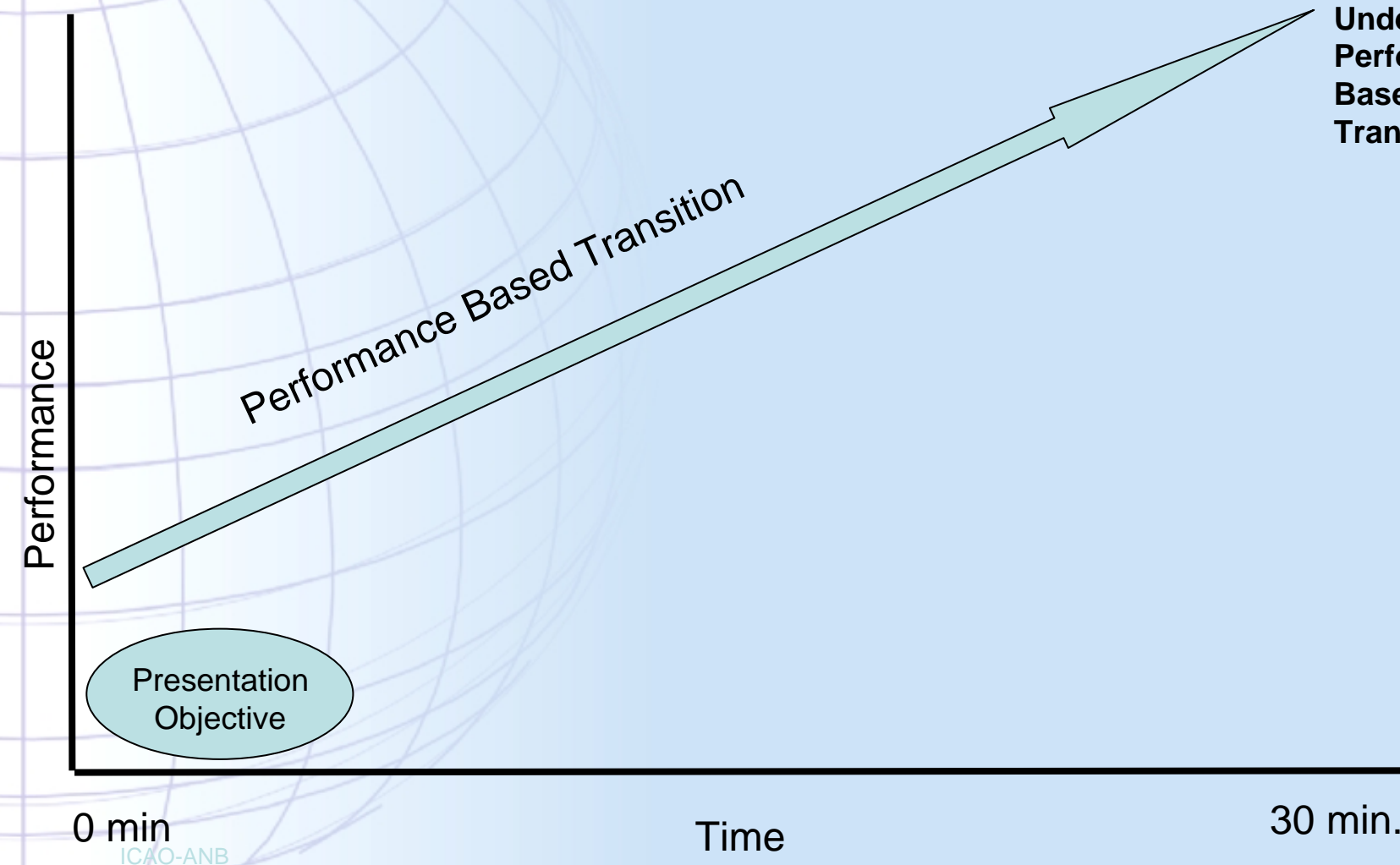
- Endorsed by 35<sup>th</sup> Session of the Assembly
- Vision:
  - ✓ Globally interoperable
  - ✓ All users & flight phases
  - ✓ Safe, economic, environmental & secure
- ATM user expectations are drivers for change, requiring:
  - ✓ Safety case
  - ✓ Business case
- Foundation for ATM System Requirements



# Performance Based Transition



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# Presentation Objectives



- Raise awareness for need to change from technology/solution based to anticipated performance improvement based
- Provide guidance on how to adopt performance based approach
- Promote globally harmonized/agreed transition to ATM system envisaged in *Air Traffic Management Operational Concept* (Doc 9854)

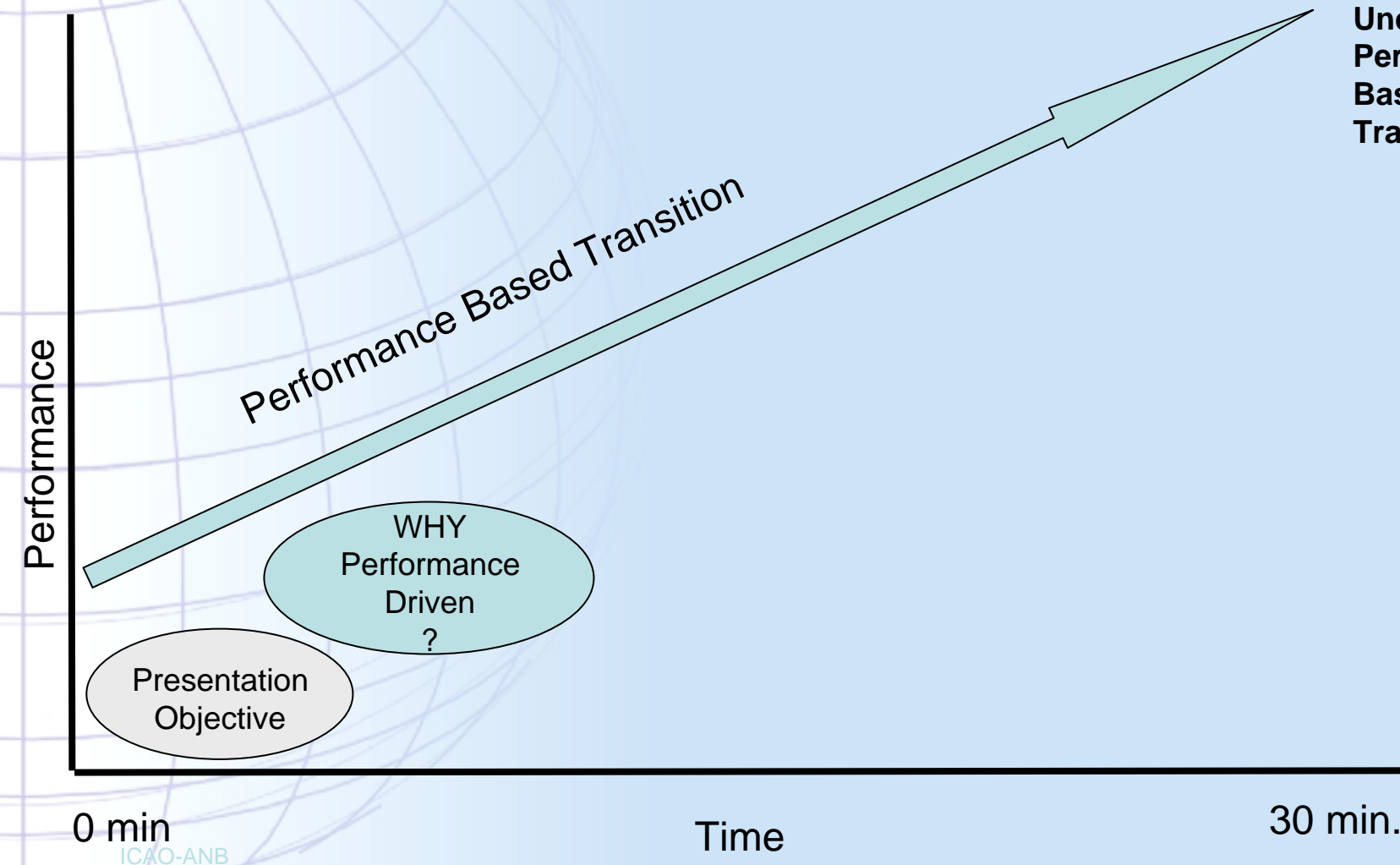


# Performance Based Transition



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# WHY Performance Driven ?



- **Performance Based Approach is based on the following three principles:**
- ✓ **Strong focus on desired/required results.**
  - ✓ **Informed decision making, driven by the desired/required results.**
  - ✓ **Reliance on facts and data for decision making.**



# WHY Performance Driven ?

## Strong focus on desired/required results



- In stead of prescribing *solutions*, desired/required *performance* is specified.
- Management attention is shifted from a resource and solution centric view (*how will we do it*) towards a primary focus on desired/required (*performance*) results (*what is the outcome we are expected to achieve*).
- This implies finding out
  - ✓ what the current performance situation is,
  - ✓ what the most appropriate results should be,
  - ✓ clarifying who is accountable for achieving those results.



# Informed decision making, driven by the desired/required results.



- ➔ “Informed decision making” requires that decision makers develop a good understanding of the mechanisms which explain how drivers, constraints, shortcomings, options and opportunities influence (i.e. contribute to, or prevent) the achievement of the desired/required results.
- ➔ This means working “backwards” from the “what”—the primary focus—to decisions about the “how”.
- ➔ Only then can decisions—in terms of priorities, trade-offs, selection of solutions and resource allocation—be optimised to maximise the achievement of the desired/required (performance) results.

# Reliance on facts and data for decision making.



- ➔ In the Performance Based Approach the desired/required results as well as the drivers, constraints, shortcomings and options are expressed in quantitative terms, rather than just in a qualitative way.
- ➔ The rationale for this is that “if you can’t measure it, you can’t manage it”, i.e. unless you measure something you don't know if it is getting better or worse.
- ➔ When facts and data are used, they should be relevant and reflect reality.
  - ✓ This requires the adoption of a (performance) measurement culture.
  - ✓ It also necessitates associated investments in data collection and management.

# Advantages



## The advantages of the Performance Based Approach are:

- ➔ It is result oriented, allows customer focus and promotes accountability;
- ➔ Policy making becomes much more transparent when the goals to be reached are publicly stated in terms of performance outcome rather than solutions;
- ➔ The shift from *prescribing solutions* to *specifying desired/required performance* also gives more freedom and flexibility in selecting suitable solutions, which in turn is a catalyst for more cost effectiveness. Furthermore, solutions can be more easily adapted in a diverse and changing environment.
- ➔ Exclusive bottom-up approaches (“technology driven approach” and “solutions searching for a problem to solve”) are easier to avoid;

# Advantages (cont.)



- Reliance on anecdotal evidence can be replaced by a more rigorous scientific approach employing quantitative and qualitative methods;
- The focus on desired/required results helps decision makers to set the right priorities, make the most appropriate trade-offs, choose the right solutions and perform optimum resource allocation;
- Organisations will be more successful in reaching goals, i.e. the general effect of the approach is that it ensures improved predictability of benefits;
- It is worth the investment: the adoption of a Performance Based Approach typically results in cost savings (cost avoidance) which is orders of magnitude larger than the cost of applying the approach.

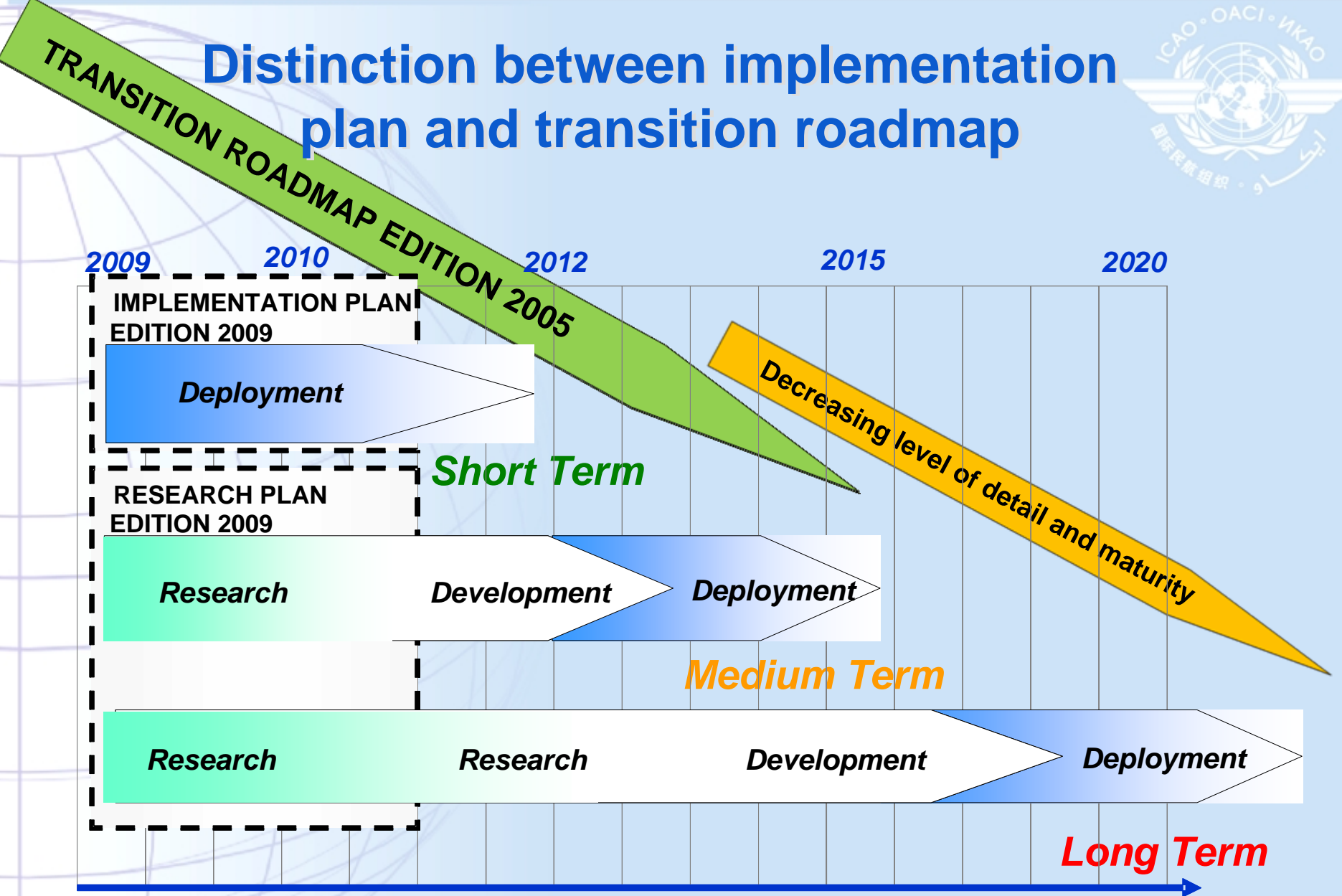
# Planning Process Outputs



- ➔ The transition to the operational concept is to occur in a focused way via a set of coordinated planning processes which operate at *local*, *regional* and *global level*.
- ➔ In terms of level of detail, these planning processes produce three kinds of outputs which will be regularly updated according to the need:
  - ✓ **Transition roadmaps**, which are a high level representation of the selection of *operational improvements* and their *deployment* interdependencies (in terms of prerequisites), adapted to the needs of a particular planning area (at *regional* or *local level*).
  - ✓ **Implementation plans**, which are intended to be derived from the *short term* part of *transition roadmaps*. They lay out a detailed set of *development* and *deployment* actions — including their timing — for all involved members of the *ATM community*.
  - ✓ **Research plans**, which lay out the *research* needed today to develop the medium and *long term* parts of *transition roadmaps* to a level of maturity suitable for turning them into *implementation plans*.



# Distinction between implementation plan and transition roadmap





# ALIGNING PLANNING



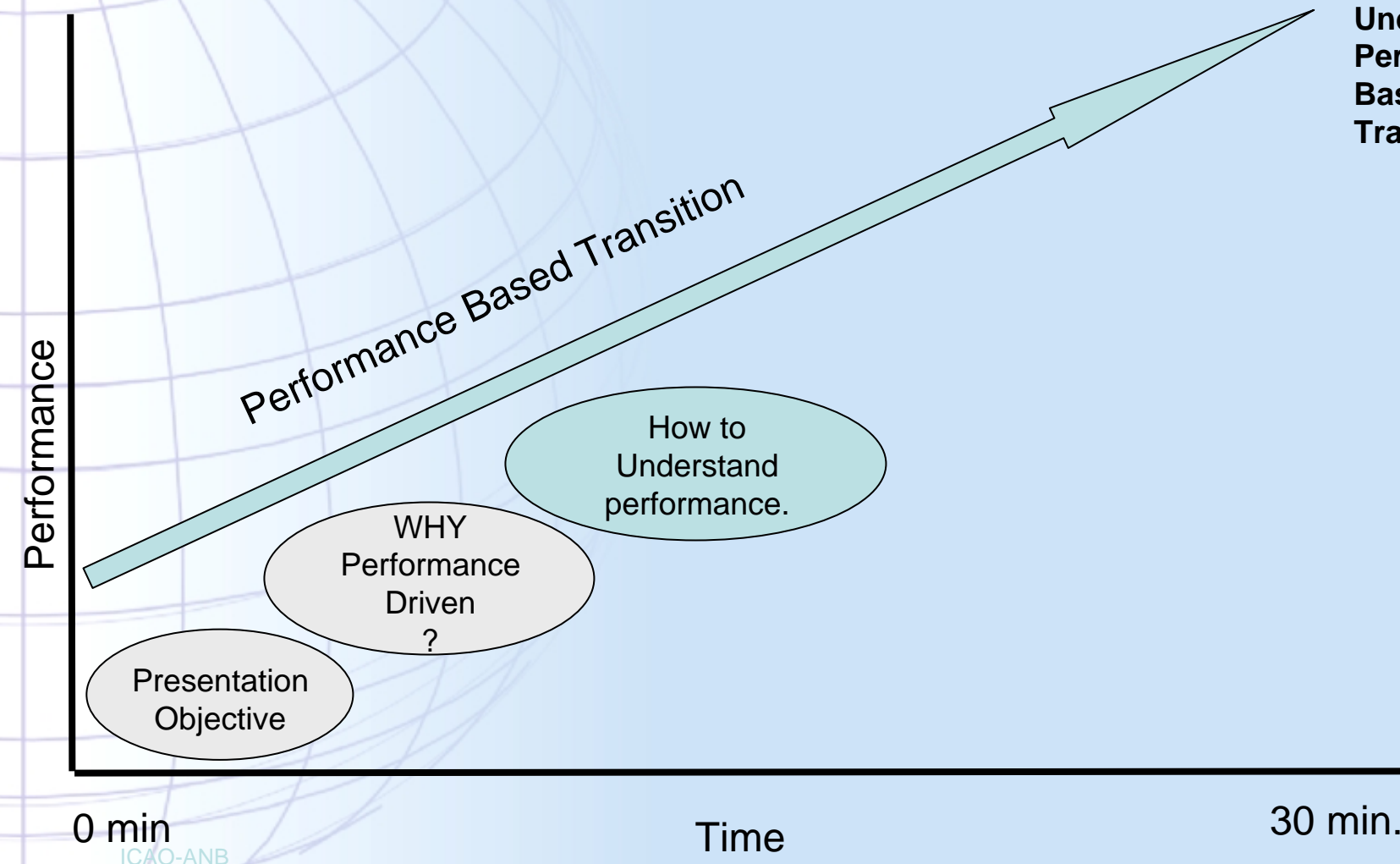
- ➔ Misalignment of data, performance measurement and assessment between regions/States leads to *transition roadmaps* and plans based on different assumptions.
- ➔ *Transition planning* is conducted at *regional/local* levels using a certain *planning Cycle*. Same cycle should be used by regions/States and these cycles should be synchronized.
- ➔ Standard cycle considers planning horizon of 20 years
  - ✓ After each 5 year cycle, implementation should be reviewed to assess *operational improvements*
  - ✓ *Operational improvements* planned in previous short term plan will now become operational
  - ✓ Research should have progressed the knowledge about transition roadmap
  - ✓ Initial research should have been completed for first part of the *long term* period.

# Performance Based Transition



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# How to understand Performance ?

## → The past and now: Performance Review

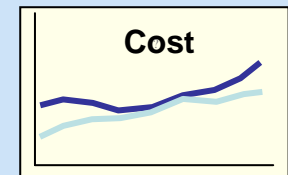
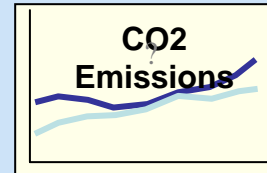
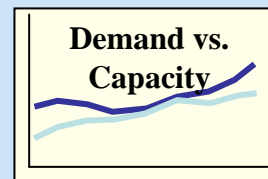
- ✓ (performance) Data capture
- ✓ Analysis (trends)
- ✓ Reporting

## → How to improve: Performance Planning

- ✓ Understanding performance impact
- ✓ Validation

*Global  
Operational  
Outcomes  
and KPI's*

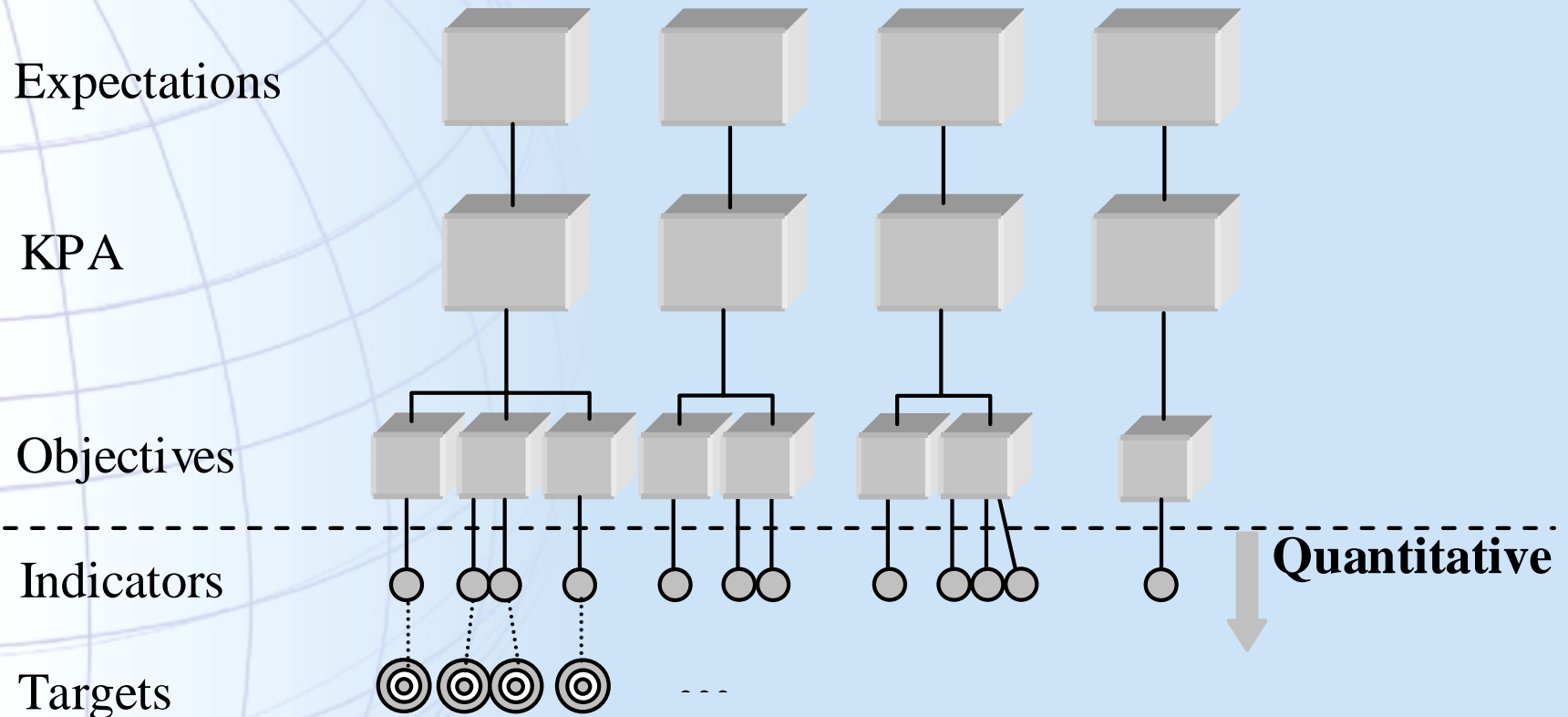
### *GOO 5 : Optimized Airspace and Route Structures*



# Understanding Performance

- **Performance Objectives:** Specific, **M**easurable, **A**chievable, **R**elevant & **T**imely (SMART) objectives defined to satisfy ATM community expectations.
- **Performance Indicators:** to measure achievement of performance objective
- **Performance Targets:** value of *performance indicators* that need to be reached/exceeded to fully achieve *performance objective*.
- **Performance gaps:** *Performance indicators* compared against *performance targets* identifying gaps
- **Performance Assessment metrics:** determine which data needs to be collected to calculate values of *performance indicators*

# PERFORMANCE MEASUREMENT



Objective is met when indicators meet or exceed targets

# ASSESSING PERFORMANCE



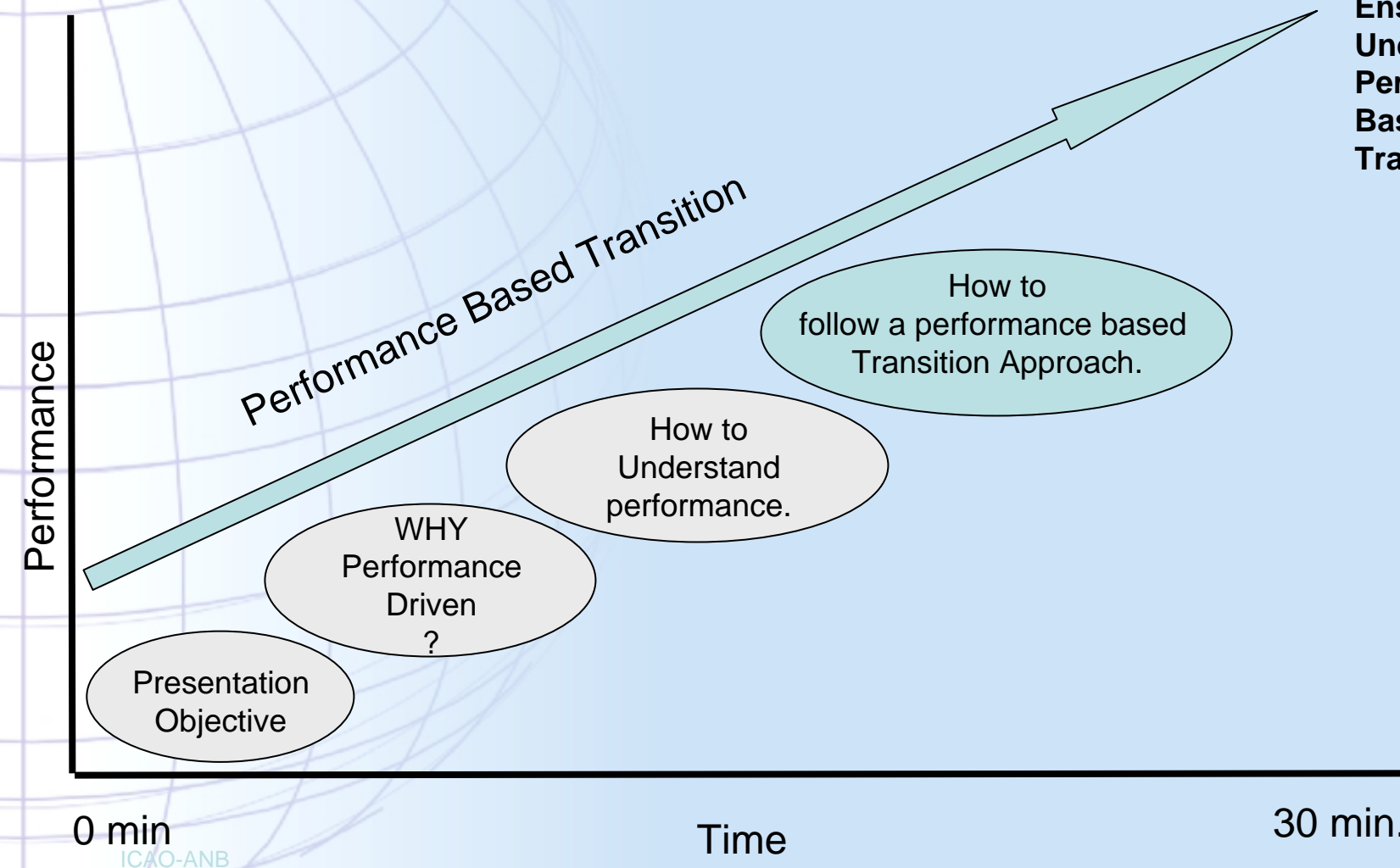
- **Assess current performance:** establish baseline & track progress towards *performance objectives*
- **Identification/diagnosis performance gaps:** Performance gaps denote current/anticipated mismatch (unfavorable) between current/planned performance and performance target.
- **Addressing performance gaps:** *Operational improvements* in terms of changes to ATM system that are on transition path towards *Global ATM Operational Concept* and result in a direct performance enhancement.
- **Developing list of options for operational improvements:** *Operational improvements* made possible by technical systems, human factors, procedure and industrial enablers in terms of feasibility, timing, cost and impact on operational change. *Global Air Navigation Plan* (Doc 9750) is one of the sources, which can be used.
- **Building/updating transition roadmaps:** *Performance gaps* identify the affected *performance objectives*. Categorization of *operational improvements* according to *performance objectives* leads to development of appropriate shortlist of candidate solutions. If the solution is not included in the transition roadmap, then it should be selected on the basis of maturity or research, if no mature solution is available.



# Performance Based Transition



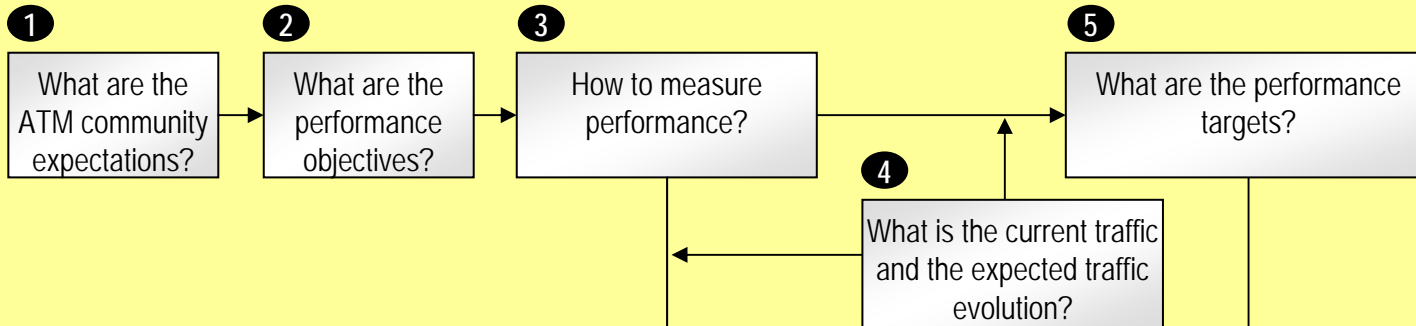
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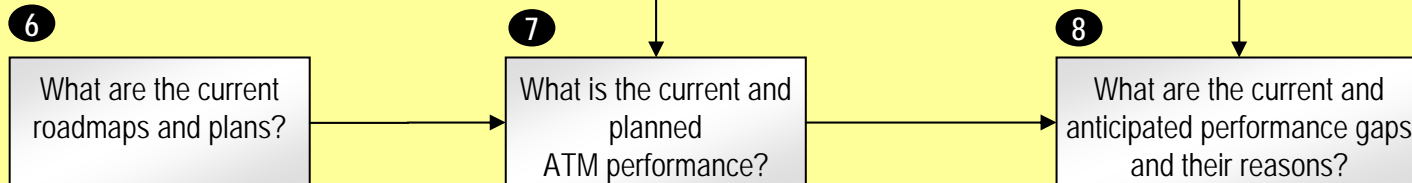
# Performance Based Transition Approach



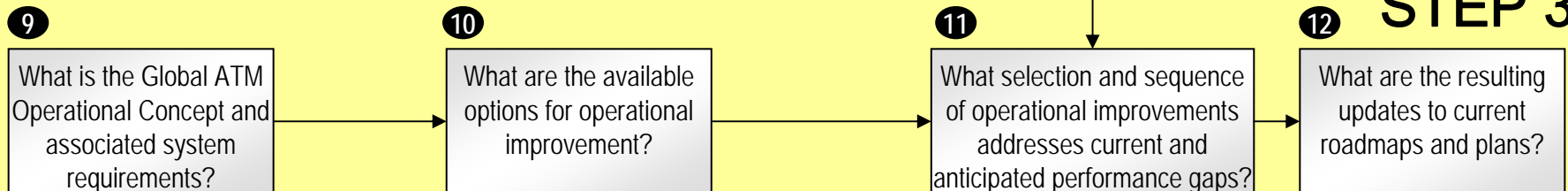
## STEP 1



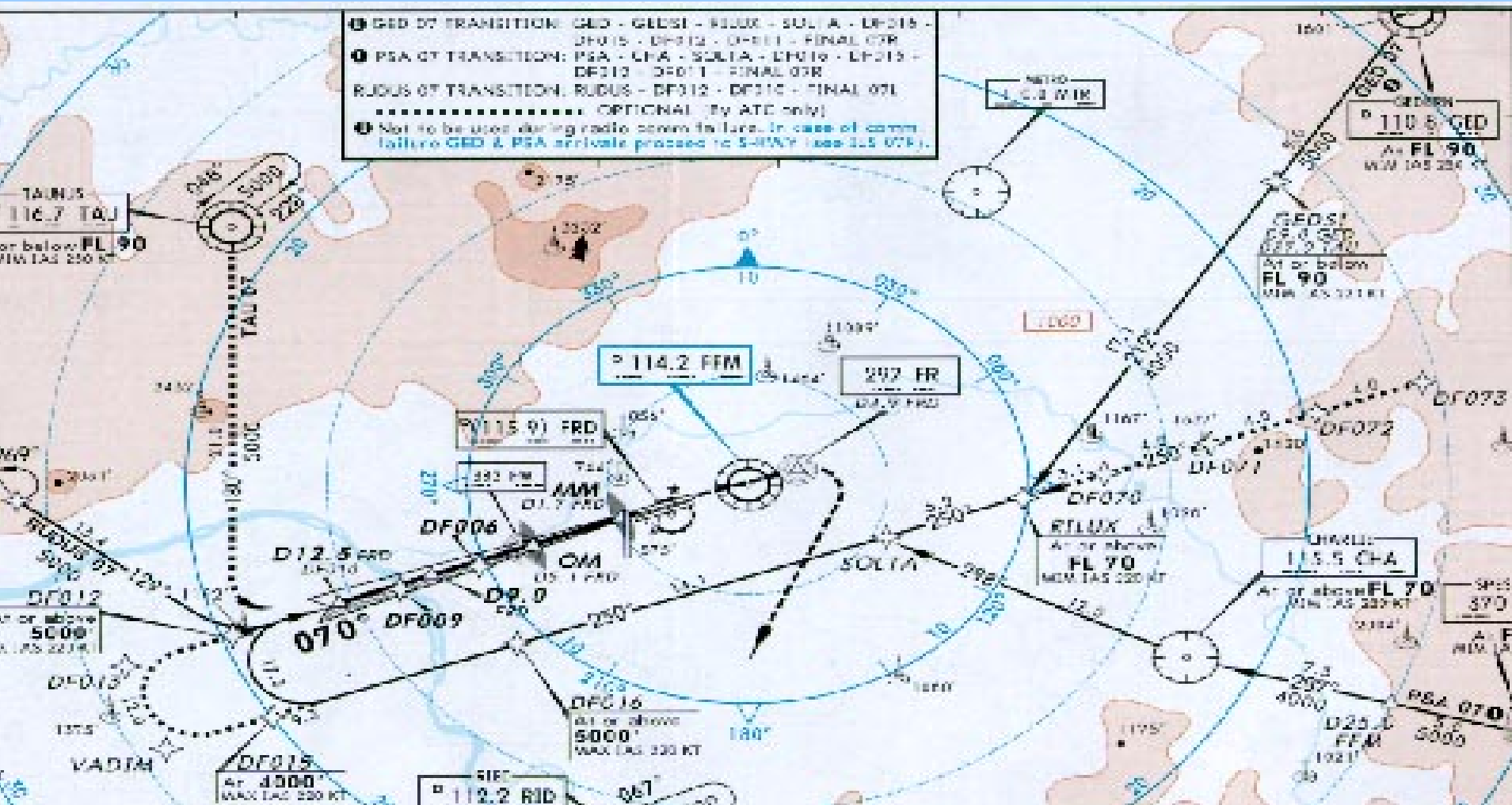
## STEP 2



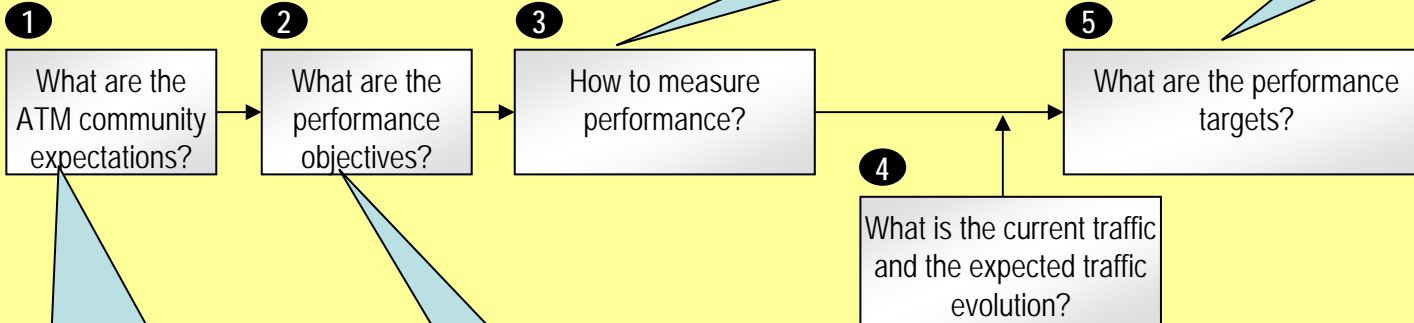
## STEP 3



- Airport approaches
- Environment/Noise



## STEP 1



e.g. Number of complaints  
e.g. Number of noise violations

e.g. Max 20 noise Violations in 2010  
Or  
-50% complaints in 2010

**The ATM system should contribute to the protection of the environment by considering noise, gaseous emissions and other environmental issues in the implementation and operation of the global ATM system**

Noise emissions and their impacts are minimised for each flight to the extent possible.

Aerodrome annual traffic volume is expected to be 73% higher in 2020 than in 2005 (measured in flights)

## STEP 2

6

What are the current roadmaps and plans?

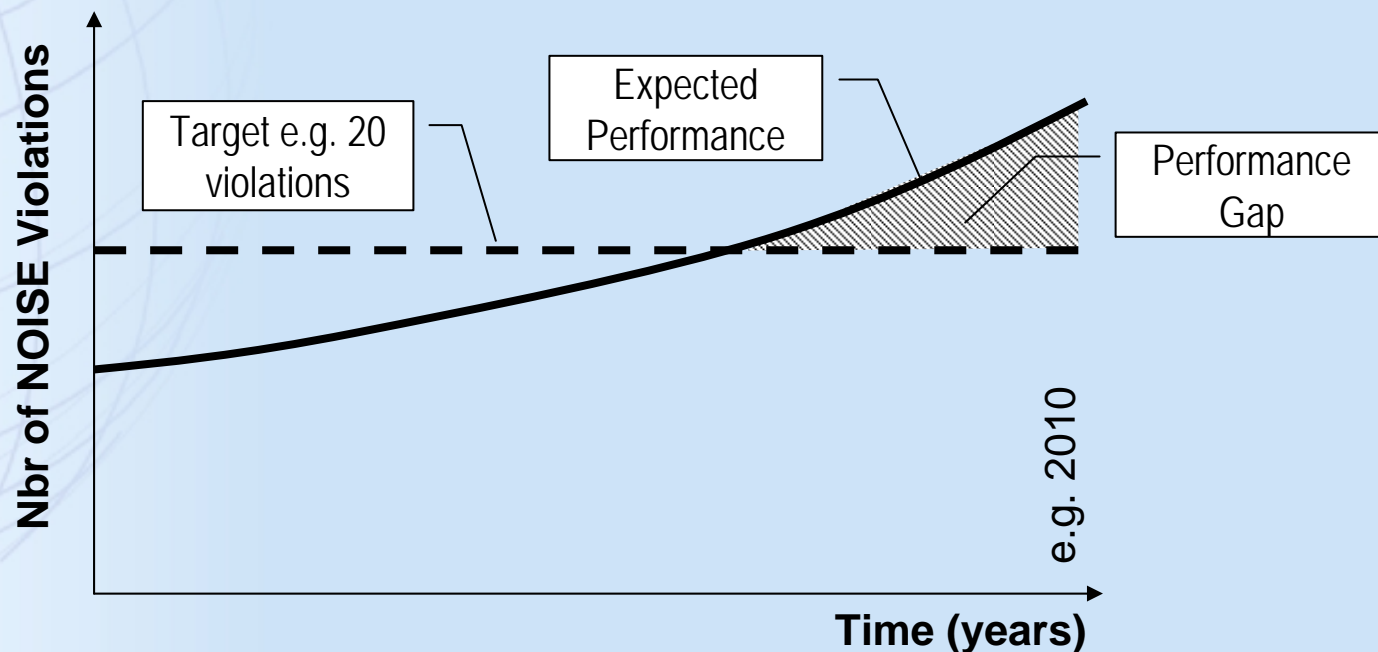
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What is the current and planned ATM performance?

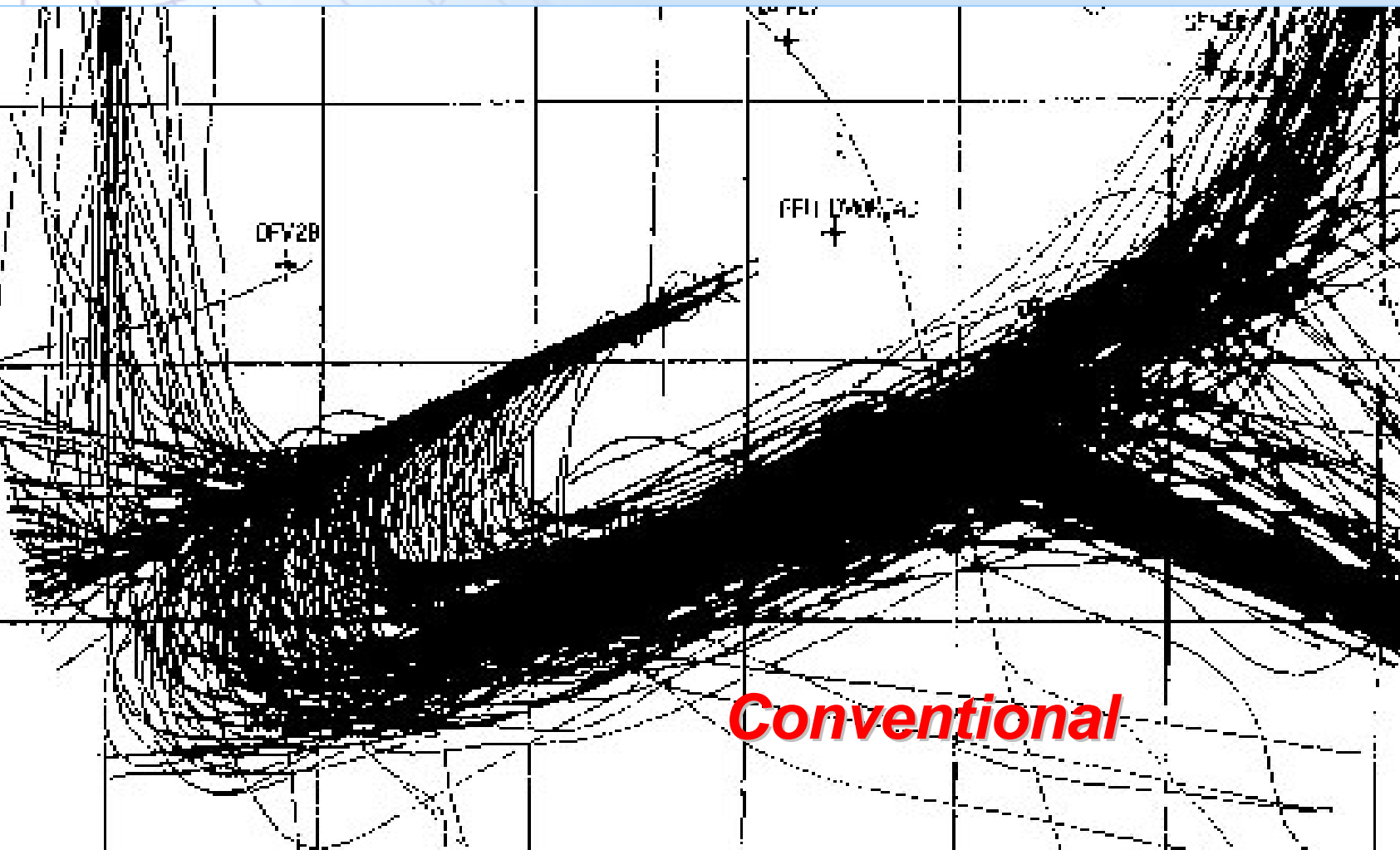
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What are the current and anticipated performance gaps and their reasons?

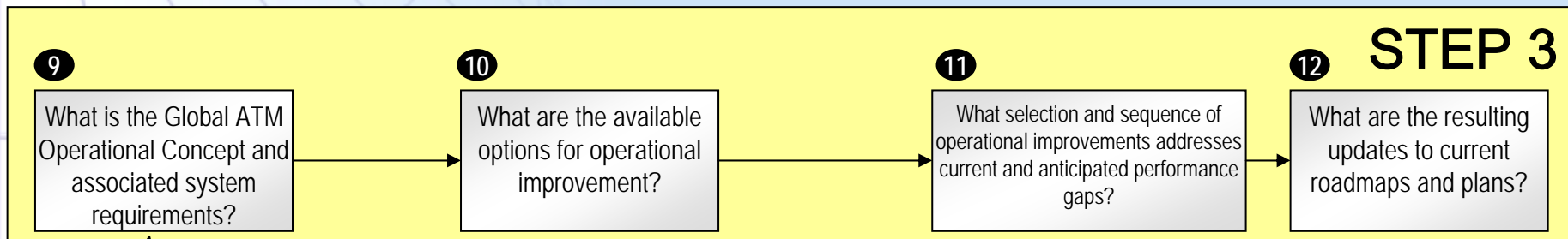
Maintain  
Conventional  
Arrivals



# Current Roadmap: Conventional Arrivals



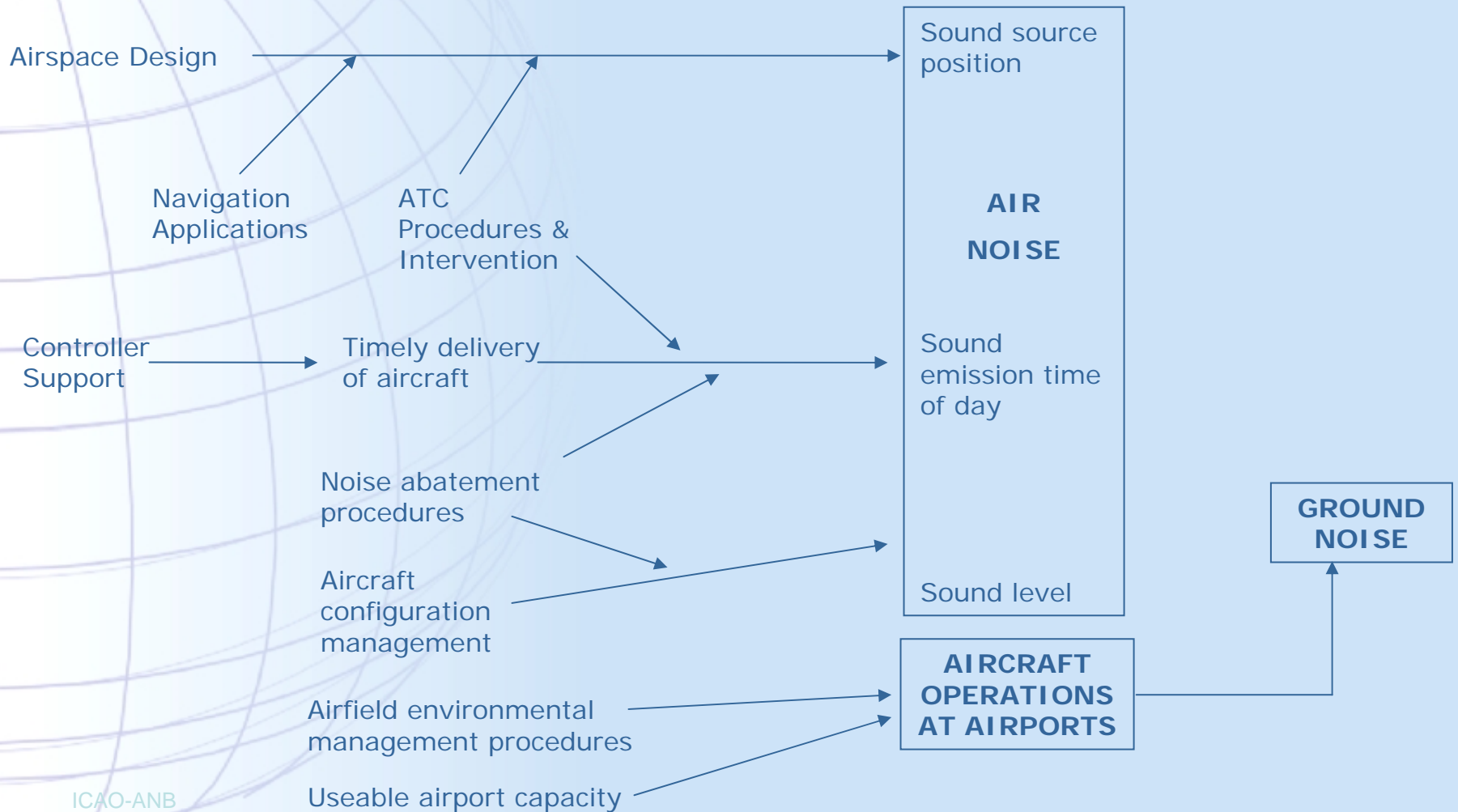




**Ensure that environmental issues are considered in the design, development, and operation of all aspects of the ATM system**

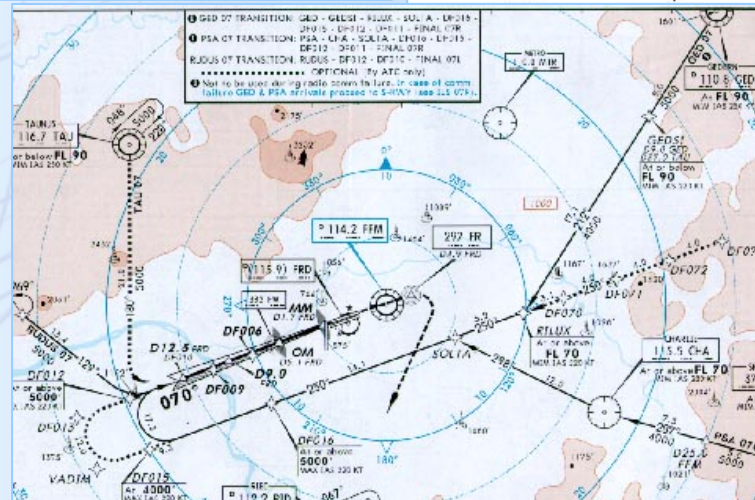
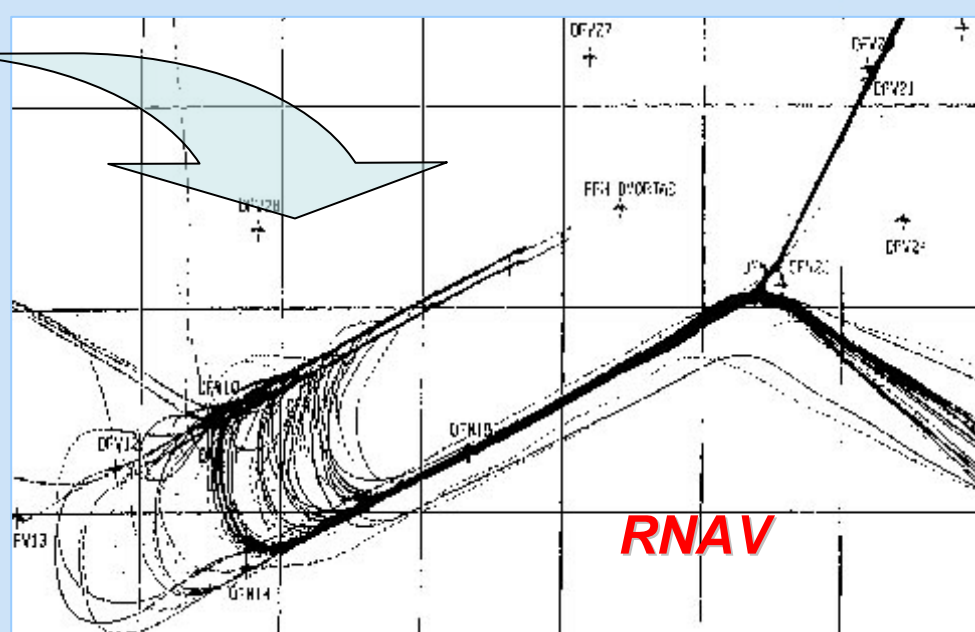
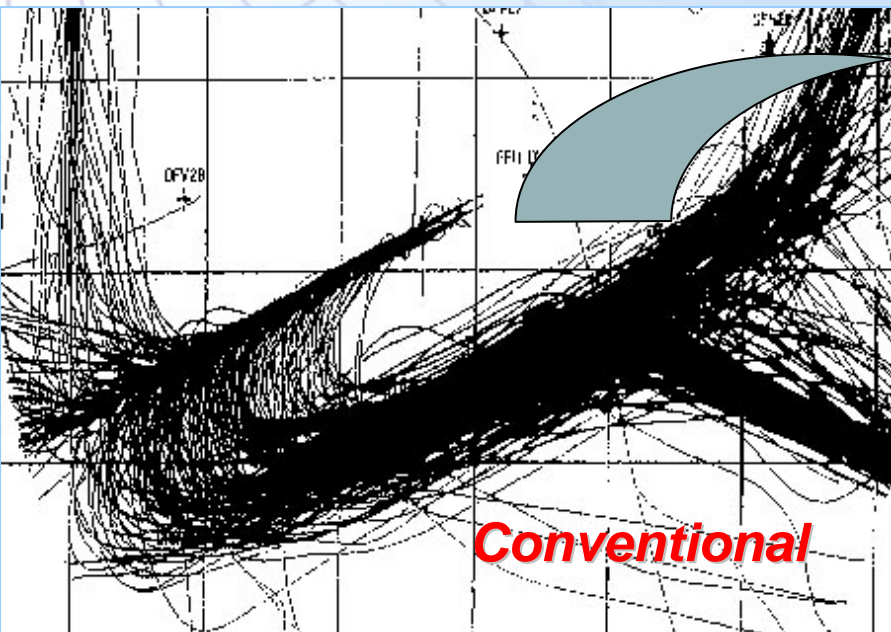
Understanding performance Influence  
Trade-offs

# Understanding Performance Influence

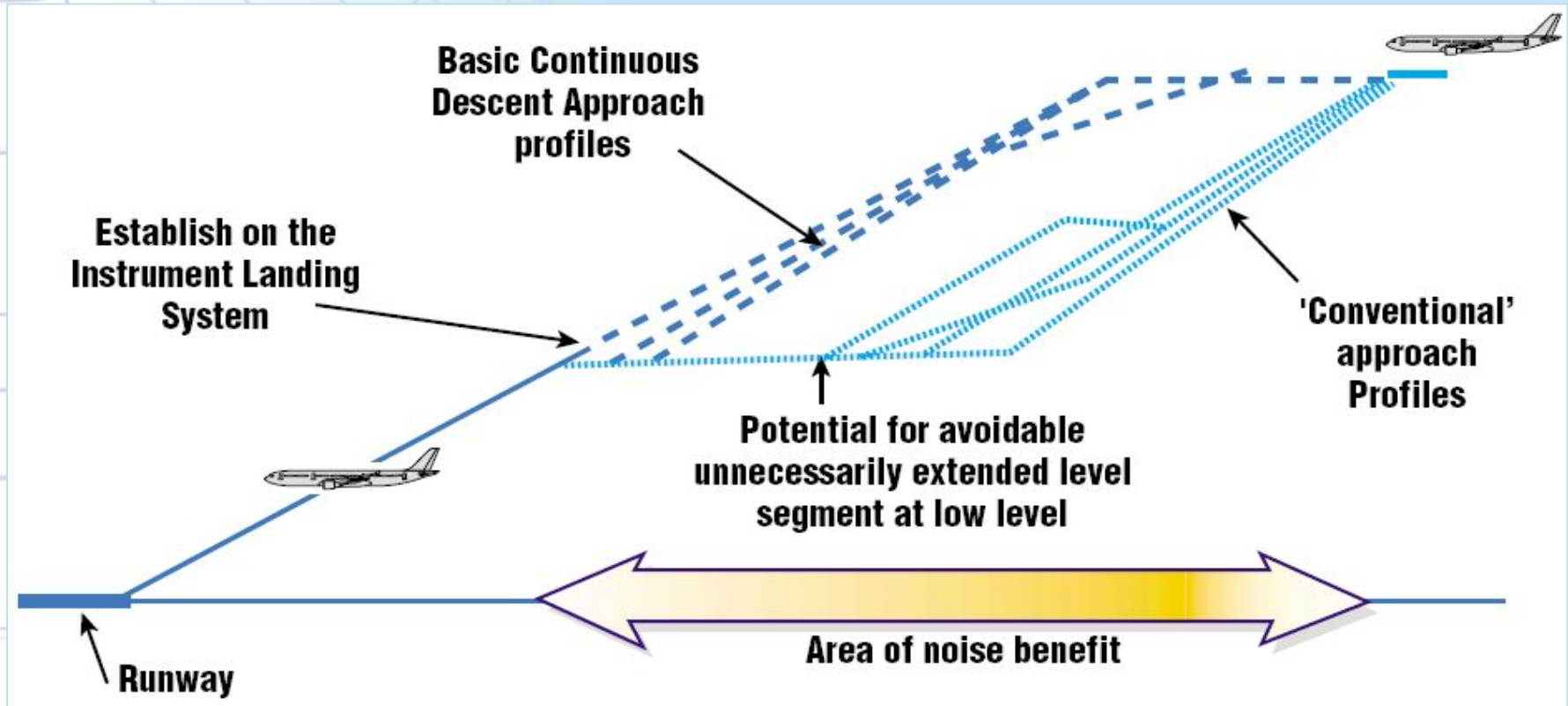


# From Conventional to RNAV Arrivals

## Harmonising aircraft performance



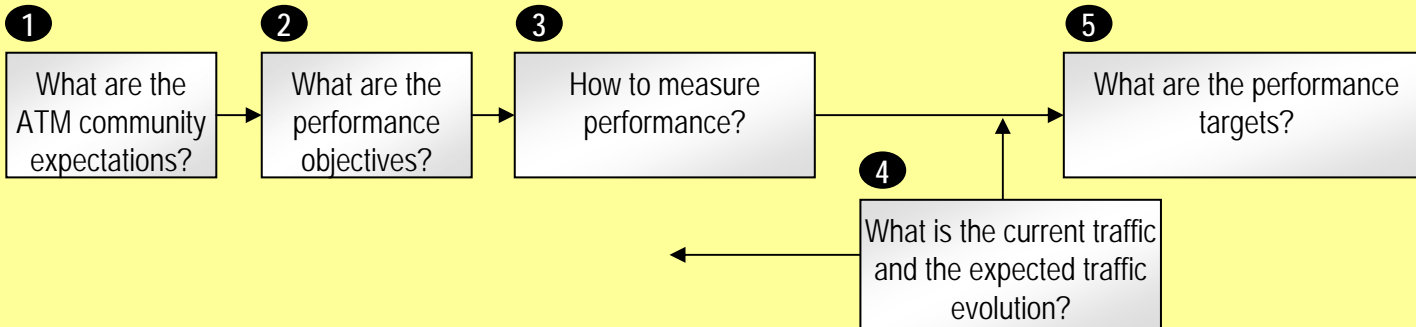
# Continuous Descent Approach



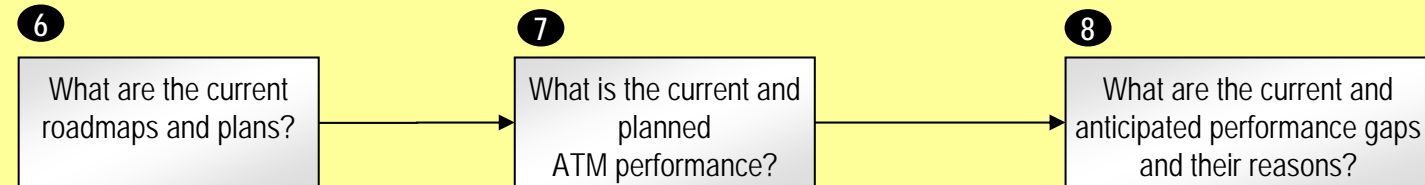
# Performance Based Transition Approach



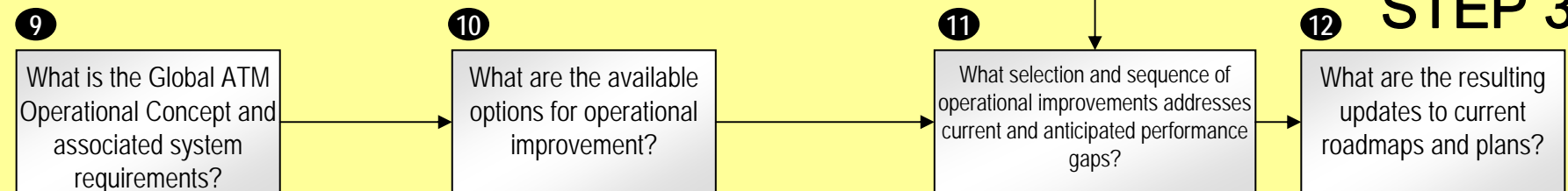
## STEP 1



## STEP 2



## STEP 3

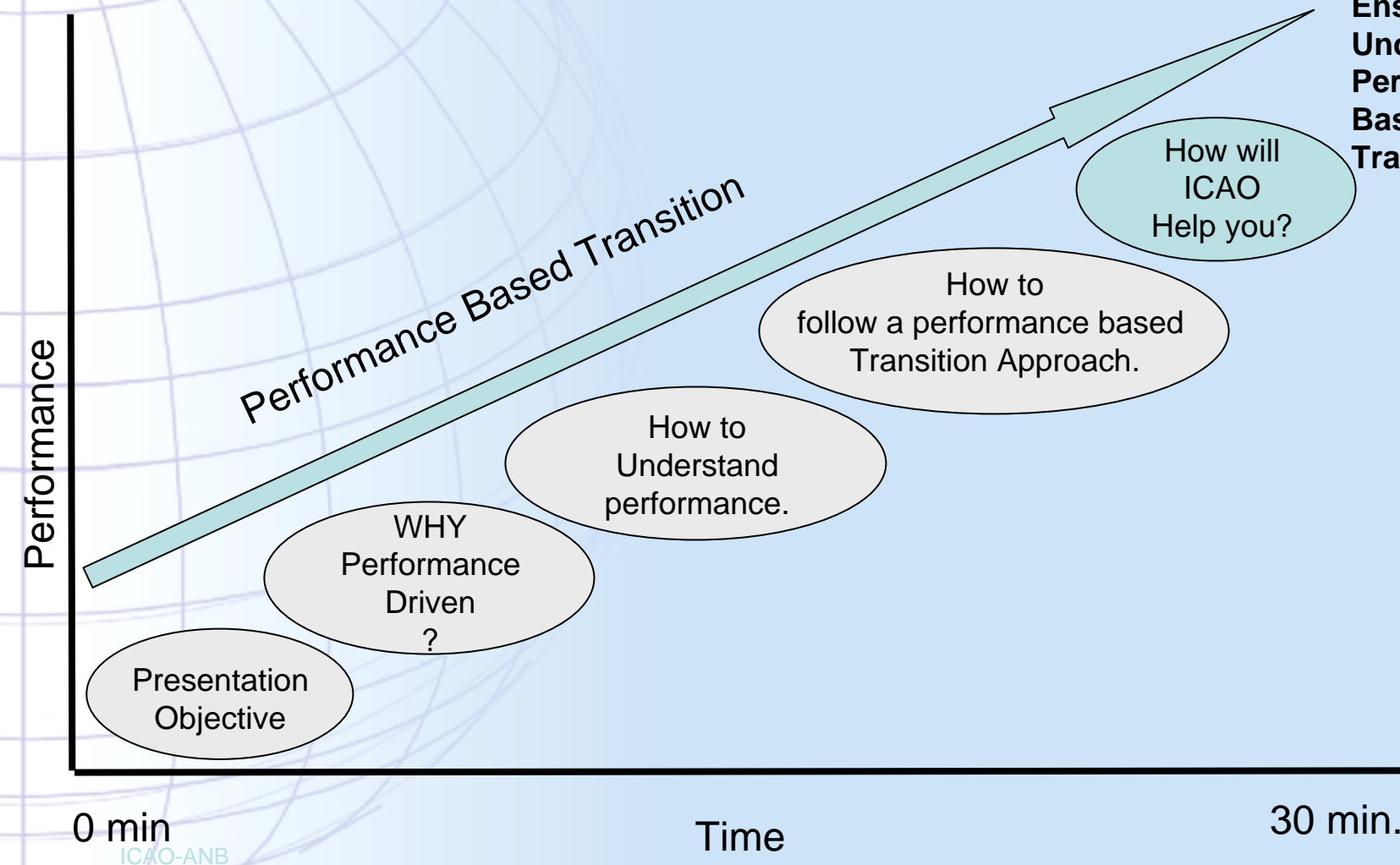




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# ENVISAGED PLANNING ENVIRONMENT



- The collaborative planning process will be aided substantially by the development of a virtual planning environment, with the transfer of information conducted in real time within a distributed information network. It will place all materials required for information decision making at easy access – including process used by other States/regions to make their decisions, and important lessons learned. Thus States/regions can take guidance from each other.
- It is expected that ICAO would develop, operate and maintain this planning environment within the context of global ATM planning support.

# GUIDANCE



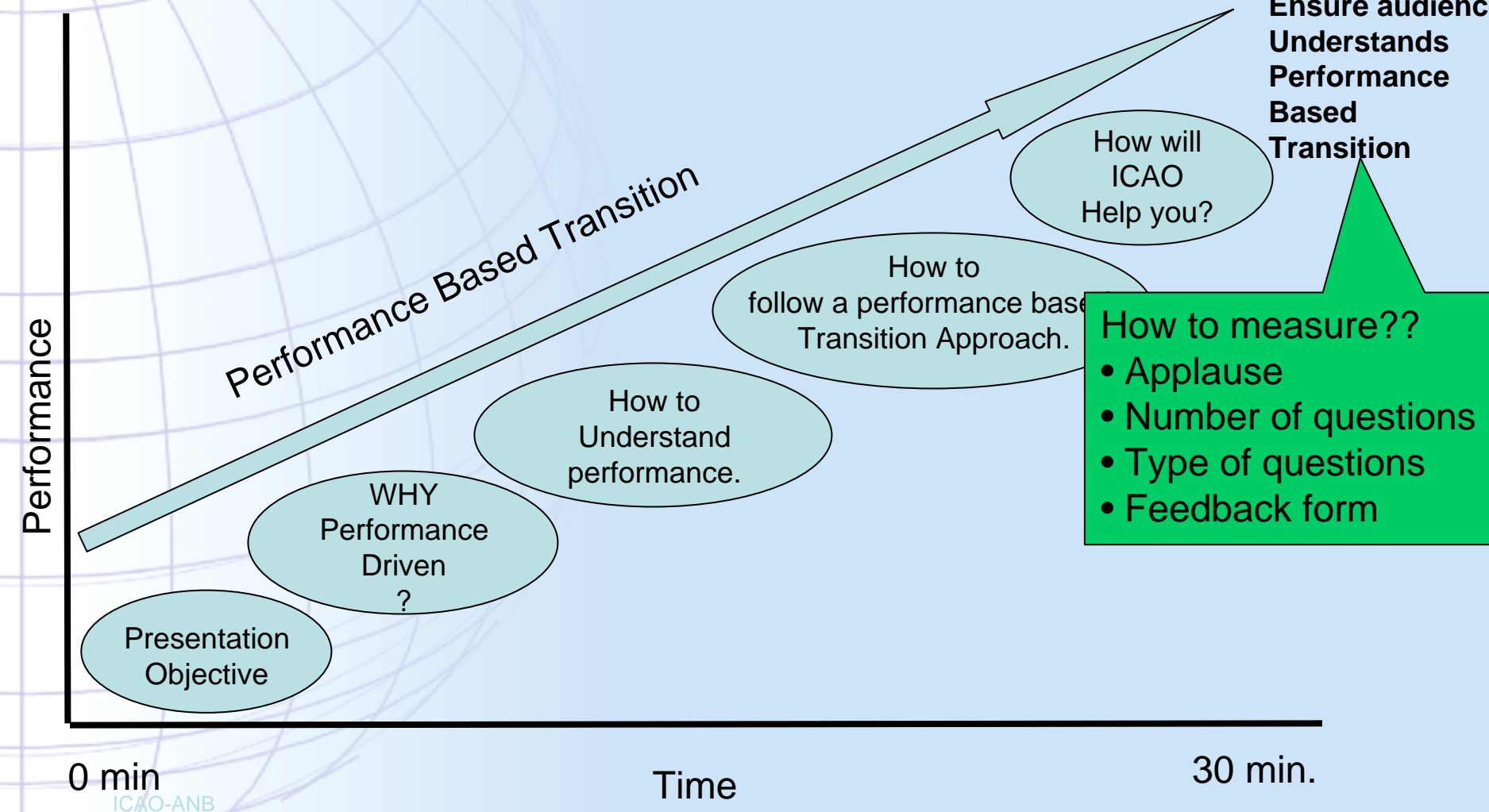
- Some of the important guidance materials, which can be referred for harmonization planning process are as follows:
- ✓ a) *Global ATM Operational Concept* (Doc 9854)
  - ✓ b) Generic (global) list of available options for *operational improvements* in Doc 9854
  - ✓ c) Global list of *ATM community expectations* as given in Doc 9854
  - ✓ d) Region specific list of available options for *operational improvements* for regional/local planning
  - ✓ e) *ATM community expectations* at the regional level and their priorities for use in regional/local planning
  - ✓ f) *Global and regional set of performance objectives* to be used at regional/local level
  - ✓ g) *Global and regional guidance* on measuring performance (including common definitions)
  - ✓ h) *Global and regional guidance* on long term traffic forecast

# Conclusions

- Understanding Performance is Key for successful transition
  - ✓ Past, current and future
  
- 3-step transition approach
  - ✓ Set targets
  - ✓ Identify and understand performance gaps
  - ✓ Select and plan Operational Improvements
  
- The Future is Performance based

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ICAO-ANB

