Global ATM System

~ Planning and Implementation ~

H.V. SUDARSHAN, Technical Officer
International Civil Aviation Organization

Workshop on the Development of Business Case for the Implementation of CNS/ATM Systems (Lima, 10-14 November 2008)

Overview

- Global ATM system
- Planning by partners
- Global/Regional/National level
- Subregional/Multinational approach
- Other Planning Mechanisms
  - Homogeneous ATM areas
  - Major Air Traffic Flows
- An update on implementation
  - Strategy
  - e-ANP

Global ATM System

- It is a worldwide system
  - Meets agreed levels of safety
  - Provides for optimum economic operations
  - Environmentally sustainable
  - Meets national security requirements
  - Provides seamlessness for all users during all phases of flight
- Achieves seamlessness through
  - Homogeneous ATM areas and Major Traffic flows
  - Interoperability (common requirements, Standards and procedures) and harmonization (tools and timing)
  - Performance based equipment carriage

Global Plan Initiatives (GPIs)

- **Main focus of the revised Global Plan is on Global Plan (Performance) Initiatives and they:**
  - **are the Options for ATM improvements**
  - **relate to Operational Concept Components**
  - **result in direct performance enhancements**
  - **meet global performance objectives**
  - **are developed on the basis of Industry Roadmaps and current regional activities**
  - **bring near- and medium-term benefits to aircraft operators**

GPIs and their relationships to the major groupings

GPI		En-route	Terminal area	Aerodrome	Supporting Infrastructure	Related Operational Concept Components
GPI-1	Flexible use of airspace	X	X			AOM, AUO
GPI-2	Reduced vertical separation minima	X				AOM, CM
GPI-3	Harmonization of level systems	X				AOM, CM, AUO
GPI-4	Alignment of upper airspace classifications	X				AOM, CM, AUO
GPI-5	RNAV and RNP (Performance-based navigation)	X	X	X		AOM, AO, TS, CM, AUO
GPI-6	Air traffic flow management	X	X	X		AOM, AO, DCB, TS, CM, AUO
GPI-7	Dynamic and flexible ATS route management	X	X			AOM, AUO

GPI		En-route	Terminal area	Aerodrome	Supporting Infrastructure	Related Operational Concept Components
GPI-8	Collaborative airspace design and management	X	X			AOM, AUO
GPI-9	Situational awareness	X	X	X	X	AO, TS, CM, AUO
GPI-10	Terminal area design and management		X			AOM, AO, TS, CM, AUO
GPI-11	RNP and RNAV SIDs and STARs		X			AOM, AO, TS, CM, AUO
GPI-12	Functional integration of ground systems with airborne systems		X		X	AOM, AO, TS, CM, AUO
GPI-13	Aerodrome design and management			X		AO, CM, AUO
GPI-14	Runway operations			X		AO, TS, CM, AUO
GPI-15	Match IMC and VMC operating capacity		X	X	X	AO, CM, AUO

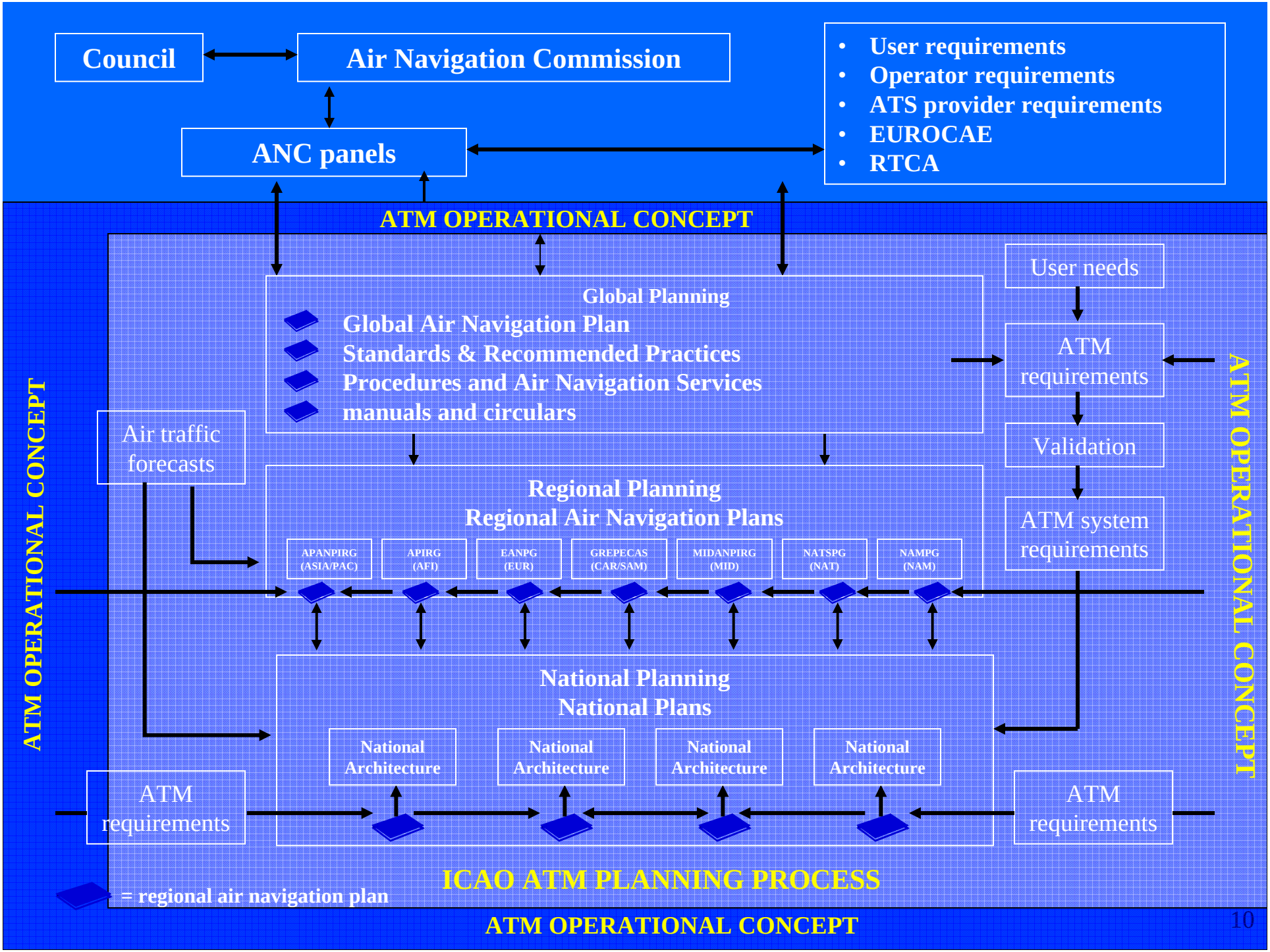
GPI		En-route	Terminal area	Aerodrome	Supporting Infrastructure	Related Operational Concept Components
GPI-16	Decision support systems and alerting systems	X	X	X	X	DCB, TS, CM, AUO
GPI-17	Data link applications	X	X	X	X	DCB, AO, TS, CM, AUO, ATMSDM
GPI-18	Aeronautical information	X	X	X	X	AOM, DCB, AO, TS, CM, AUO, ATMSDM
GPI-19	Meteorological systems	X	X	X	X	AOM, DCB, AO, AUO
GPI-20	WGS-84	X	X	X	X	AO, CM
GPI-21	Navigation systems	X	X	X	X	AO, TS, CM, AUO
GPI-23	Communication infrastructure	X	X	X	X	AO, TS, CM, AUO
GPI-23	Aeronautical radio spectrum	X	X	X	X	AO, TS, CM, AUO, ATMSDM

Planning for CNS/ATM systems by the partners …

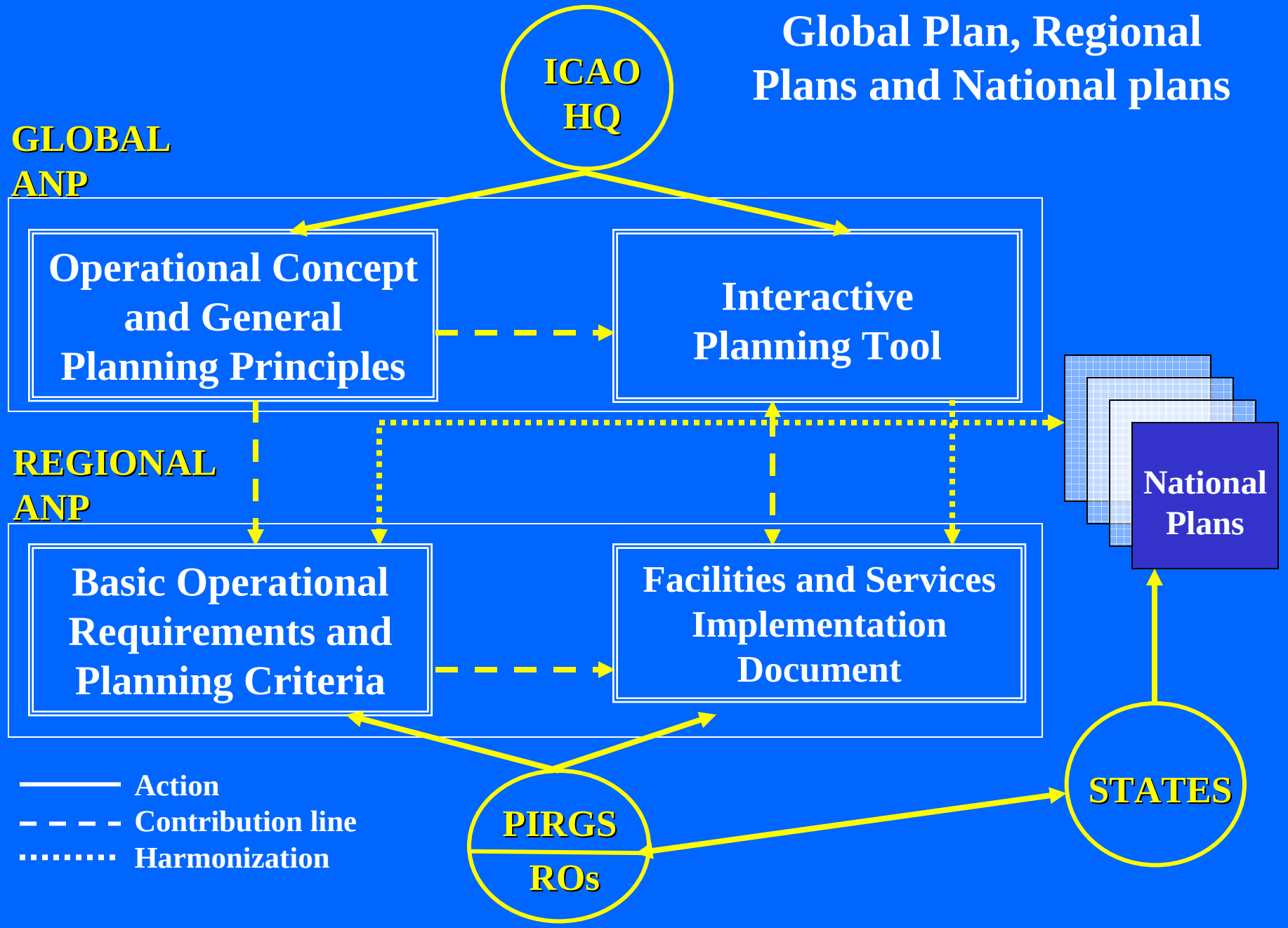
CNS/ATM Partners	Planning Levels	Deliverables	Guidance
ICAO	Global	Global plan	ICAO policy
Regional planning groups	Regional	Regional plan	Global plan
Subregional/ or Multinational groups	Subregional or Multinational	Subregional plan or Multinational	Regional plan
States	National	National plan	Regional plan

Planning for CNS/ATM systems by the partners

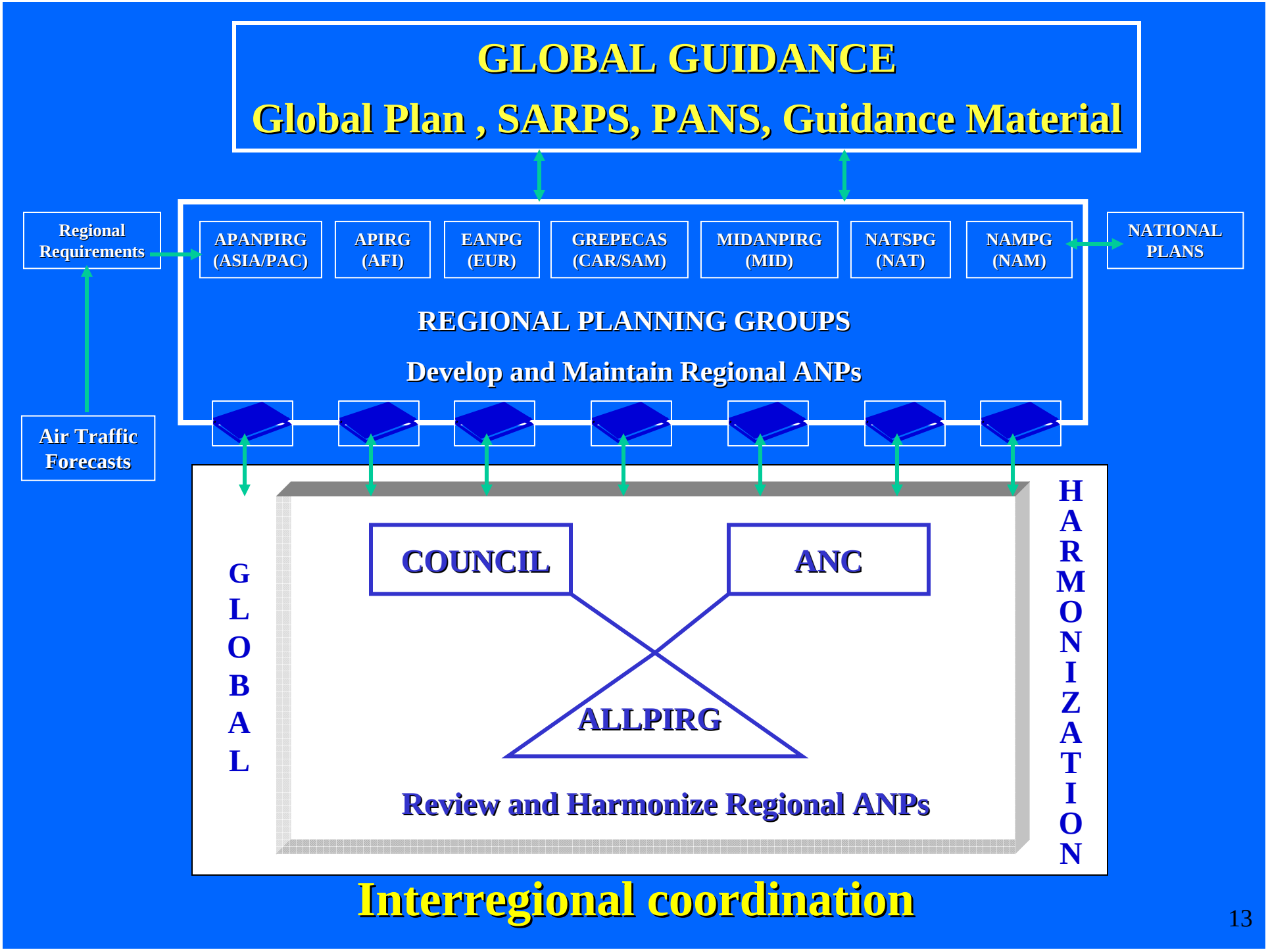
CNS/ATM Partners	Planning Levels	Deliverables	Guidance
Airspace users	Regional, national	User-driven plan	Regional and national plans
Service providers	Global, regional, national	Service-provider plan	Global, regional and national plans
Industry	Global, regional, national	Manufacturer plan	Global, regional and national plans


Council
Air Navigation Commission
ANC panels
• User requirements
• Operator requirements
• ATS provider requirements
• EUROCAE
• RTCA
ATM OPERATIONAL CONCEPT
ATM OPERATIONAL CONCEPT
ATM OPERATIONAL CONCEPT
Global Planning
Global Air Navigation Plan
Standards & Recommended Practices
Procedures and Air Navigation Services
manuals and circulars
User needs
ATM requirements
Validation
ATM system requirements
Air traffic forecasts
Regional Planning
Regional Air Navigation Plans
APANPIRG (ASIA/PAC)
APIRG (AFI)
EANPG (EUR)
GREPECAS (CAR/SAM)
MIDANPIRG (MID)
NATSPG (NAT)
NAMPG (NAM)
National Planning
National Plans
National Architecture
National Architecture
National Architecture
National Architecture
ATM requirements
ATM requirements
= regional air navigation plan
ICAO ATM PLANNING PROCESS
ATM OPERATIONAL CONCEPT

Global Plan, Regional Plans and National plans



Planning process at the regional level


GLOBAL GUIDANCE
Global Plan , SARPS, PANS, Guidance Material
Regional Requirements
APANPIRG (ASIA/PAC)
APIRG (AFI)
EANPG (EUR)
GREPECAS (CAR/SAM)
MIDANPIRG (MID)
NATSPG (NAT)
NAMPG (NAM)
NATIONAL PLANS
REGIONAL PLANNING GROUPS
Develop and Maintain Regional ANPs
Air Traffic Forecasts
GLOBAL
COUNCIL
ANC
ALLPIRG
Review and Harmonize Regional ANPs
HARMONIZATION
Interregional coordination

Subregional/ Multinational approach …

- Calls for political will
- Common goals in terms of ATM objectives and/or CNS requirements
- Not necessarily adjoining or cross-border
- Provides integration, rationalization and harmonization of systems and procedures
- Reduces equipage and maintenance costs
- Facilitates financing

Subregional/ Multinational approach …

- Envelops multiple States/regions
- Infrastructure establishment by a multinational group, service providers or State(s)
- Operational management rests with multinational group, service providers or State(s)
- Better utilization of combined and unified airspace

Subregional/ Multinational approach

- Early benefits to airspace users and States
- Lends itself to a business case
- User charges is one means of cost recovery; will also serve as a source of repayment
- Possible to establish joint charges collection agency
- Based on Homogenous ATM area
- Examples: Eurocontrol; ASECNA; and COSESNA

Other planning mechanisms

- **Planning based on Homogenous ATM areas**
- **Planning based on Major Traffic Flows.**

Planning based on homogeneous ATM areas and major traffic flows ...

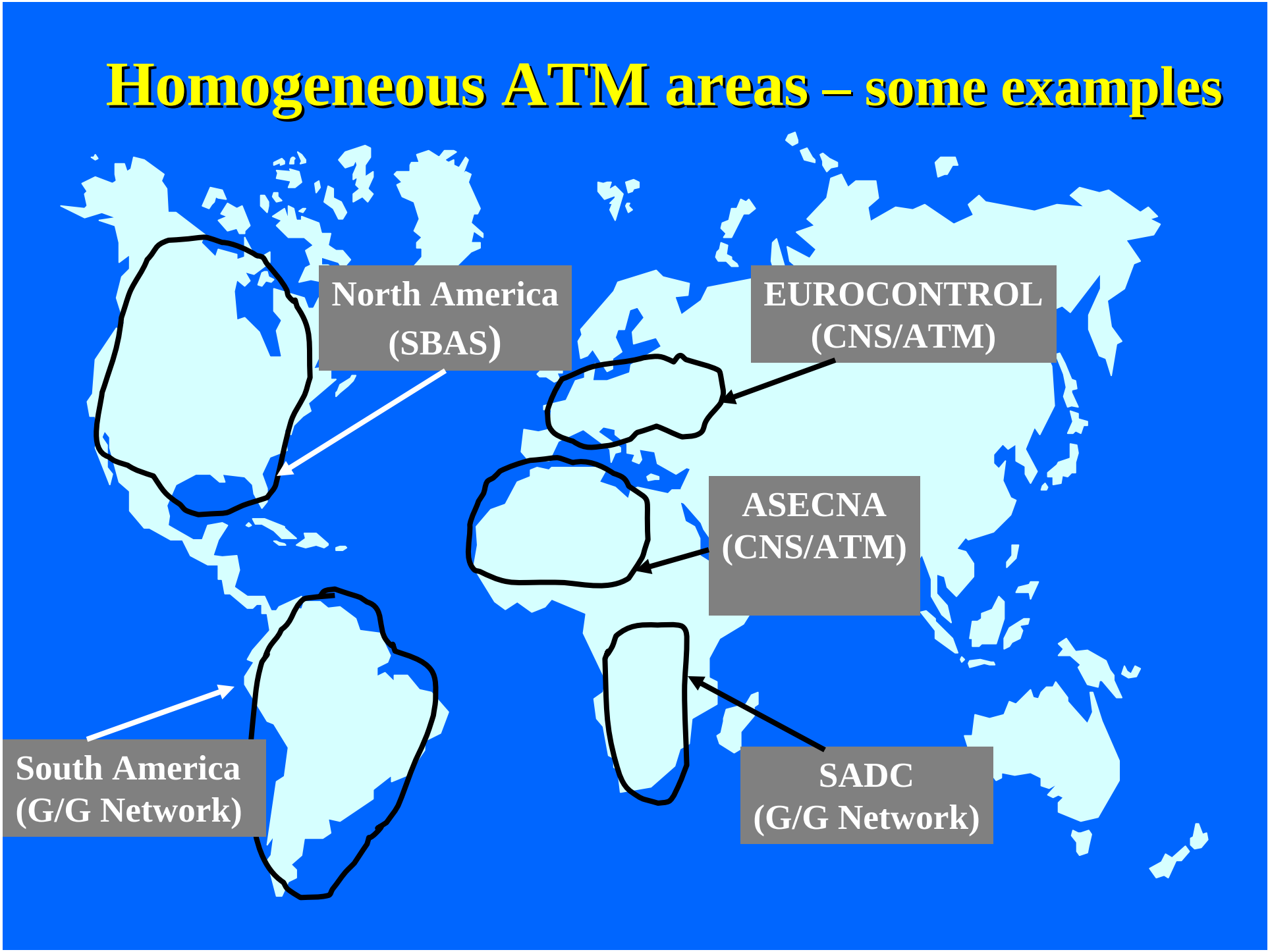
Homogeneous ATM areas

An airspace with a common ATM interest based on similar characteristics of traffic density, complexity, air navigation infrastructure requirements or other specified considerations, wherein a common detailed plan fosters the implementation of interoperable CNS/ATM systems.

They may extend over States, specific portions of States or groupings of smaller States. They may include large oceanic and continental en route areas.

.

Homogeneous ATM areas – some examples



Planning based on homogeneous ATM areas and major traffic flows

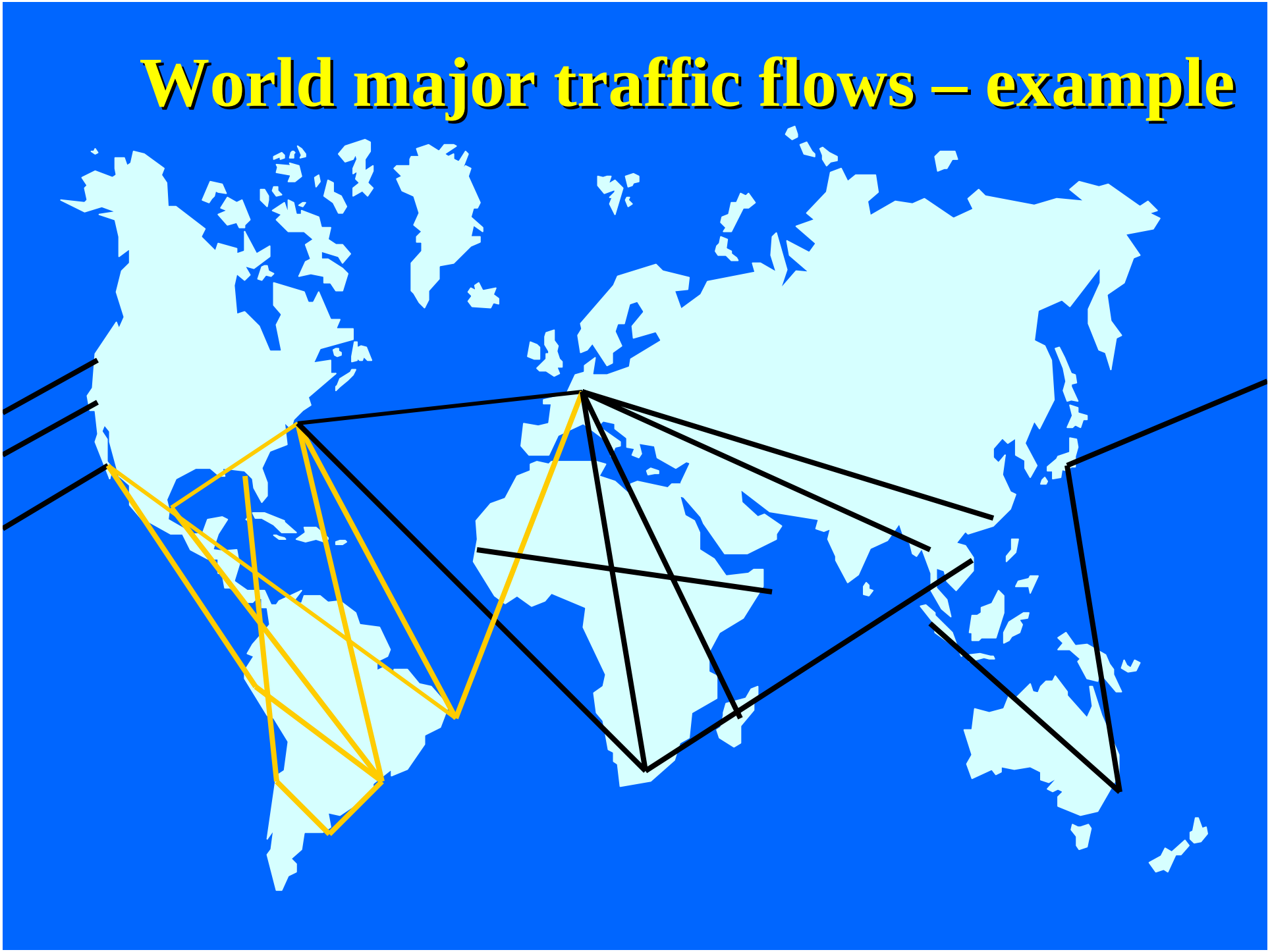
Major traffic flows

Major traffic flow: A concentration of significant volumes of air traffic on the same or proximate flight trajectories.

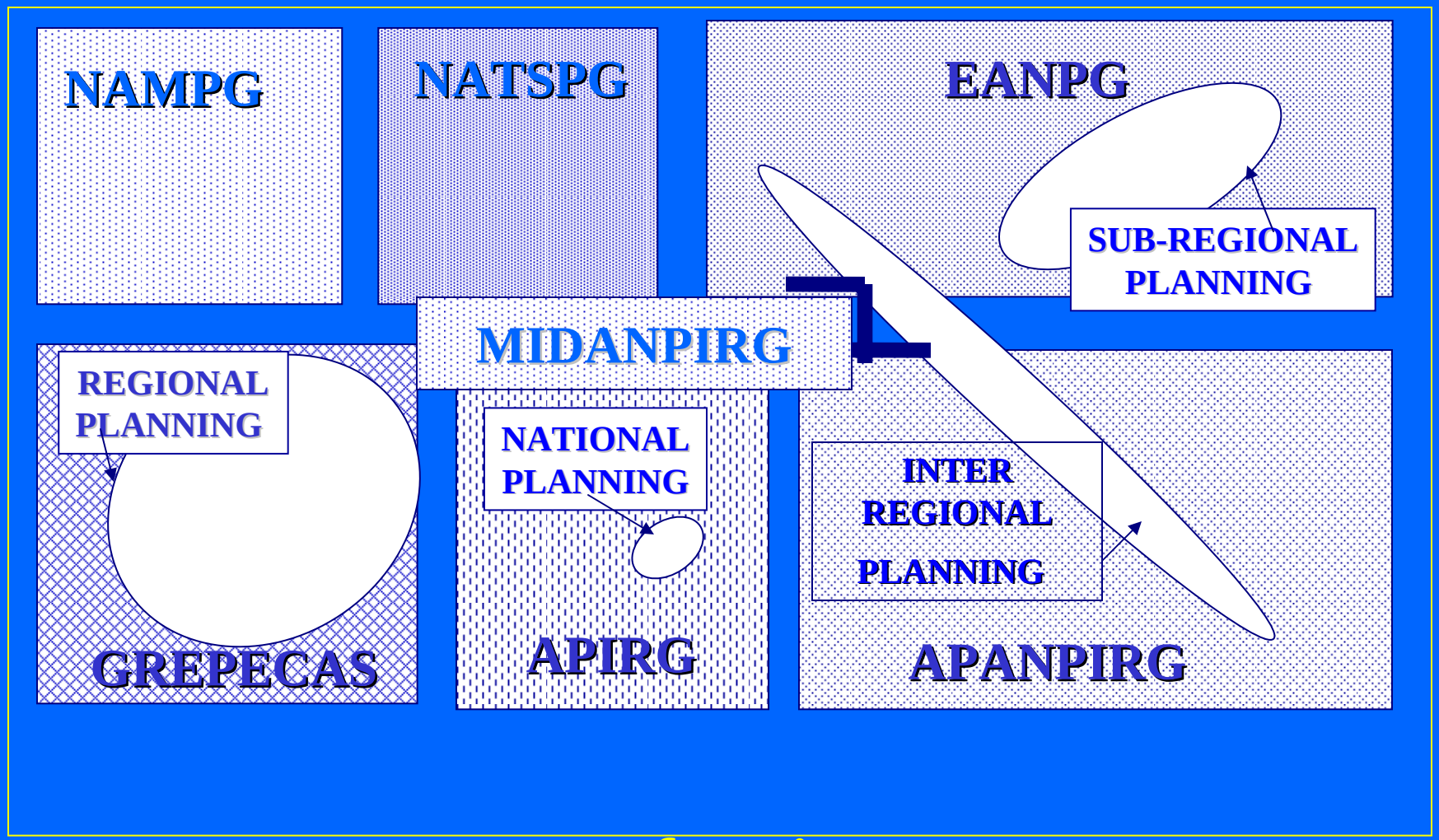
Note: Major traffic flows may cross several homogeneous ATM areas with different characteristics

Routing area: A defined area encompassing one or more major traffic flows

World major traffic flows – example



Major traffic flows



Interface issues

Major traffic flow approach ...

- May include various types of airspace; oceanic, continental en route and terminal areas
- Common goals in terms of ATM objectives and/or CNS requirements
- Early benefits to airspace users and States

Major traffic flow approach ...

- Envelops multiple States and/or regions
- Involves consideration of air navigation infrastructure, traffic density and airspace users' needs
- Necessarily adjoining or cross-border for it to be a part of the traffic flow
- Has interoperable CNS systems

Major traffic flow approach ...

- Absorbs gate-to-gate concept
- Establishment of infrastructure could be by a multinational group, ANS provider or State(s)
- Provides integration, rationalization and harmonization of systems and procedures

Major traffic flow approach ...

- Facilitates financing
- Operational management rests with multinational group, ANS providers or State(s)
- Lends itself to a business case; consequently, it is easier to fund the project

Major traffic flow approach

- User charges is one of the means of cost recovery and will also serve as a source of repayment
- Possible to establish a joint charges collection agency

Examples of implementation based on major traffic flow approach

- Implementation RVSM from Asia to Europe via south of the Himalayas, through the Middle East, effective 23 November 2003; and
- RVSM implementation in the Europe/South America corridor, through the Africa-Indian Ocean Region, effective 24 January 2002

Approach to implementation…

- The approach to implementation is on the basis of:
  - progress already achieved
  - experience gained by PIRGs and States in the previous cycle of CNS/ATM systems implementation process
  - existing capabilities of the air navigation systems

Approach to implementation

- 23 GPIs identified for addressing short- and medium-term requirements
- All GPIs are being implemented by PIRGs and States in different degrees and different time frames

Implementation strategy

- A collective commitment of all participating/ concerned entities in the State
- CNS/ATM systems to be introduced in evolutionary stages, with progressive development of technology and procedures
- High-risk approach associated with a “big bang” implementation to be prevented
- Framework must include an integrated approach, encompassing all elements of CNS/ATM, such as technical, operational, economical and institutional issues

Implementation strategy

- Current ATM operations not be effected
- During the transition and implementation stages, no degradation in the level of safety
- Must be a continuous interface with adjacent areas/cross-border States/States within the region to ensure coordinated implementation and consistency of ATM services

e – Air Navigation Plans: Objectives

- e-ANP format has two objectives
  - at the global level: reconcile the Regional ANPs with the ATM operational concept, the Global ANP and the ICAO business plan;
  - at the regional level: expedite regional planning and coordination process through simplifying and freeing from a long and cumbersome formal approval process

e – Air Navigation Plans: Deliverables

- The current provisions in the ANP Volume I, concerning establishment of ATS Routes and Table ATS 1 will be replaced by the relevant elements of the Global ANP and homogeneous ATM areas and major international traffic flows
- The current provisions in the ANP Volume II, comprised of FASID tables (AOP, CNS, ATM, MET, SAR, AIS) will be replaced by the agreed CNS/ATM systems infrastructure; all details currently listed in Table ATS 1 and all FASID Tables be moved to an integrated web-based Air Navigation Planning Database which will be designed to support the coordination, agreement and recording process between ICAO and States/international 0rganisations

SUMMARY

- **Discussed planning mechanisms**
  - **Global, Regional, Subregional, and National level**
  - **Planning based on Homogeneous ATM areas and Major Traffic Flows**
- **Reviewed Implementation approach**
  - **Strategy**
  - **e-ANP**

— END —