ICAO MID Region

Global ATM Operational Concept Training Seminar

Update of Global Air Navigation Plan for CNS/ATM Systems (Doc 9750)

Cairo, Egypt

28 November to 1 December 2005

BACKGROUND 1

11th Air Navigation Conference, 2003

- Agreed that the Global Plan is a significant component in the development of regional and national plans
- Global ATM Operational Concept endorsed

INDUSTRY ROADMAP

- May 2004: Sixth Air Navigation Commission Consultation with Industry
- Global ATM: From concept to reality
- Industry partners agreed to jointly develop an action plan (“roadmap”) for presentation to the Commission
- Commission agreed that relevant material be incorporated into a proposal for amendment of the Global Plan

BACKGROUND 2

35th ICAO Assembly, October 2004

- Resolution A35-15: Global ATM Operational Concept endorsed. States, PIRGs and the aviation industry called upon to use the Concept as the common framework to guide planning and implementation of CNS/ATM systems and to focus all such development work on the concept.

A GLOBAL ATM SYSTEM

- A worldwide system that, on a global basis, achieves interoperability and seamlessness across regions for all users during all phases of flight
- Meets agreed levels of safety
- Provides for optimum economic operations
- Is environmentally sustainable
- Meets national security requirements

2ND AMENDMENT OF GLOBAL PLAN

Based on:

- Recommendations of 11th Air Navigation Conference
- Logical groupings of operational initiatives proposed in the Industry roadmap, renamed as Global Plan Initiatives and proposed to be placed in Volume II of the Global Plan

2nd AMENDMENT OF GLOBAL PLAN

- Objective: To ensure that maximum advantage be taken of presently available aircraft capabilities in the near and medium terms
- Over longer term, transition strategies being developed on the basis of the Global ATM Operational Concept to be incorporated in the Global Plan

EXPECTED GLOBAL ATM BENEFITS

An increase in airspace capacity, thereby increasing efficiency, while at the same time not adversely affecting established safety levels

EXPECTED BENEFITS FOR STATES

- A reduction in the overall cost of operation and maintenance of ground infrastructure, as traditional ground systems become obsolete and satellite technology is increasingly employed
- Enhancement of infrastructure to handle additional traffic with minimal investment

EXPECTED BENEFITS FOR AIRLINES

- Reduced flight operating costs
- Reduced delays
- Will permit use of a minimum set of avionics everywhere

ENVIRONMENTAL BENEFITS

Impact of aircraft engine emissions reduced, by:

- Optimization of cruising levels and routes
- Implementation of continuous descent arrivals and approaches

GLOBAL PLANNING VISION

To achieve a seamless, global ATM system through the implementation of air navigation facilities and services in a manner that is

- Progressive
- Cost-effective
- Cooperative

REGIONAL PLANNING PROCESS

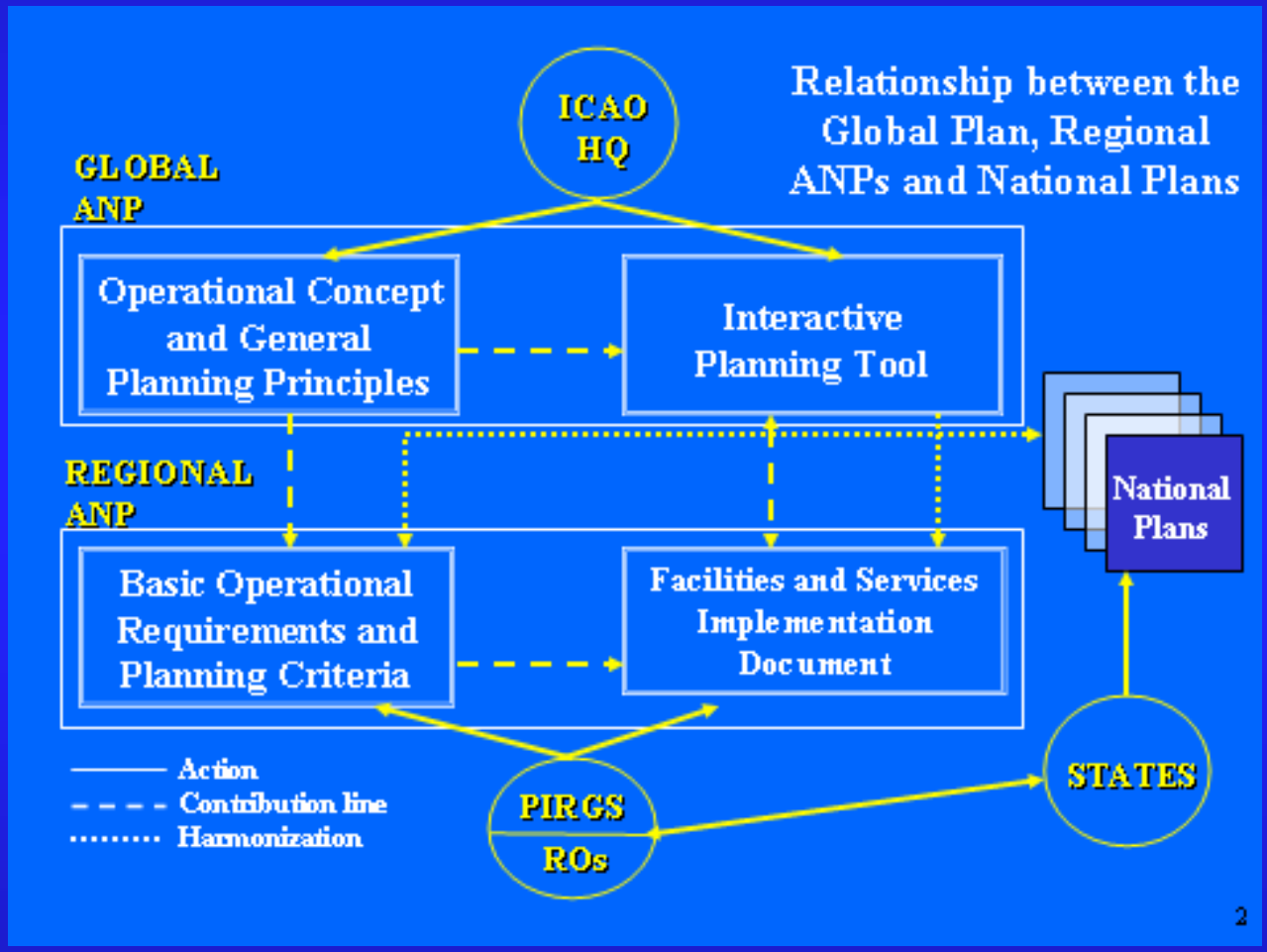
The regional planning process is and will remain the principal engine of ICAO's planning and implementation work through the Planning and Implementation Regional Groups (PIRGs) and the Regional Offices

ROLE OF TRAFFIC FORECASTS

- Forecasts represent the demand for future ATM
- PIRGs must base their work on well-developed traffic density forecasts
- Regional plans specify the infrastructure and arrangements which will supply the required level of ATM
- Uniform strategy developed by ICAO for preparation of traffic forecasts

REGIONAL PLANNING PROCESS

RELATIONSHIP BETWEEN PLANS



NATIONAL PLANNING PROCESS

- National plans are developed by States
- A need for integration and rationalization to ensure harmonization of national planning with planning at regional and global levels
- Constant interaction with neighbouring States, the PIRG, and sub-regional groups to ensure harmonization and interoperability

INTERREGIONAL COORDINATION

- Meetings of ICAO Regional Directors
- Meetings of neighbouring States of two or more regions for implementation of systems and procedures through homogenous ATM areas and major traffic flows
- Inter-regional coordination increasingly critical for implementation of Global Plan initiatives

HUMAN RESOURCE DEVELOMENT

- A seamless global air navigation system requires a professional team performing its tasks
- The members of this team must receive training at the highest level of quality
- CNS/ATM systems are based on many new concepts, presenting a major challenge to trainers

OVERALL CNS/ATM TRAINING NEEDS

- Foundation training for all professional civil aviation staff
- Training for implementation planners, at senior management level
- Job-specific training for staff that manage, operate and maintain CNS/ATM systems on an on-going basis

FOUNDATION TRAINING

In addition to subjects usually covered in civil aviation training centres:

- Global ATM Operational Concept, including supporting CNS/ATM systems
- Computer fundamentals, including networking
- Automation issues and aeronautical databases
- Satellite communications and navigation systems

Training for CNS Implementation Planners

For senior technical management staff:

- Global ATM Operational Concept
- Communications: VDL, SSR Mode S datalink, HF datalink, ATN
- Navigation: GNSS, including standard augmentation systems
- Surveillance: SSR Modes A, C and S, ADS, ADS-B, ASAS

Training for ATM Implementation Planners

In addition to an overview of CNS systems:

- Traffic forecasting and cost-benefit analysis techniques
- Air traffic management:
  - Airspace planning
  - ATS and ATFM systems and procedures
  - ATM-related aspects of flight operations
- CNS/ATM transition and implementation project planning

CNS/ATM JOB-SPECIFIC TRAINING

Resolution A35-14, Appendix H forms the basis for longer training strategies:

- Aviation training is the responsibility of States
- Highest priority on safety- and security-related training programmes
- Mutual assistance among States
- ICAO should advise States on operational oversight of training facilities
- ICAO should not participate in operation of training facilities, but should encourage and advise operators of such facilities

CNS/ATM JOB-SPECIFIC TRAINING

Because civil aviation training institutions, working individually, are unable to develop all the necessary programmes:

- Early identification of CNS/ATM training needs and priorities is necessary
- Coordination and planning of CNS/ATM training development at regional level

Organizational Considerations

Necessary to review organizational structure, because:

- Several job disciplines will no longer be required after States have fully implemented the new systems
- There will be new job disciplines as a result of implementation of new systems
- Most existing jobs will require additional training
- Old and new systems may need to operate in parallel during transition phase
- Much of the training will be in areas that involve greater use of automation

HUMAN RESOURCE PLANNING

- Human resource planning should project needs for at least five to seven years ahead
- Selection criteria for new staff to be reviewed
- Re-deployment, recruitment and training of staff is time consuming
- Even with distance learning techniques, there is still a significant amount of training that will need to be undertaken in a training centre
- Human resource planning should begin ASAP

DISTANCE LEARNING TECHNIQUES

Distance learning techniques:

- Reduces time spent in training centres
- Computer based training, including interactive training over the internet, have become efficient and cost-effective
- Such techniques lend themselves particularly well to foundation training

FUNDAMENTAL LEGAL ISSUES

- Safety of international civil aviation
- Universal accessibility without discrimination
- Continuity of service
- Respect of State sovereignty
- Certification
- Liability
- Administration, financing and cost-recovery

FUNDAMENTAL LEGAL ISSUES

- Resolution A32-19: Charter on the Rights and Obligations of States Relating to GNSS Services
- LTEP: Panel of Legal and Technical Experts on the Establishment of a Legal Framework with regard to GNSS

UPDATED GLOBAL PLAN, VOLUME II

- From ATM Objectives to Global Plan Initiatives
- Updated Global Plan focuses on operational and technical improvements that will bring near and medium term benefits to aircraft operators
- Long term initiatives as envisioned in the Global ATM Operational Concept will be added as they are developed and agreed

HOMOGENEOUS ATM AREAS

- Airspaces with a common air traffic management interest, based on similar characteristics of traffic density, complexity or infrastructure where a common plan will foster the implementation of interoperable ATM systems
- May extend over States, portions of States or groupings of States
- May also extend over large oceanic or continental areas
- Are considered areas of shared interest and requirements

Major Traffic Flows/Routing Areas

Major traffic flow:

- A concentration of significant volumes of air traffic on the same or proximate flight trajectories
- May cross several homogeneous ATM areas with different characteristics

Routing area:

- One or more major traffic flows, defined for the purpose of developing a detailed plan for implementation of ATM systems and procedures

GLOBAL PLAN INITIATIVES

Purposes:

- Enhance capacity and efficiency
  - Enroute
  - In terminal airspace
  - At aerodromes
- Support infrastructure enhancements

GPI-1: FLEXIBLE USE OF AIRSPACE

Scope:

- The optimization and equitable balance in the use of airspace between civil and military users, facilitated through both strategic coordination and dynamic interaction.

GPI-2: Reduced vertical separation minimum

Scope:

- To increase capacity and improve efficiency through optimized use of airspace and enhanced aircraft altimetry systems

GPI-3: Harmonization of level systems

Scope:

- The implementation by all States of the ICAO Flight Level Scheme based on feet as contained in Appendix 3 to Annex 2 – *Rules of the Air.*

GPI-4: Align upper airspace classifications

Scope:

- The harmonization of upper airspace and associated traffic handling through application of a common ICAO ATS Airspace Class above an agreed division level

GPI-5: Performance based navigation

Scope:

- The incorporation of advanced aircraft navigation capabilities into the air navigation system infrastructure, bringing additional safety and efficiency benefits to the airspace users

GPI-6: Air traffic flow management

Scope:

- The implementation of strategic, tactical and pre-tactical measures aimed at organizing and handling traffic flows in such a way that the totality of the traffic handled at any given time or in any given airspace or aerodrome is compatible with the capacity of the ATM system

GPI-7: Dynamic and flexible ATS route management

Scope:

- The establishment of more flexible and dynamic route systems, on the basis of navigation performance capability, aimed at accommodating preferred flight trajectories

GPI-8: Collaborative airspace design and management

Scope:

- The application of uniform airspace organization and management principles on a global basis, leading to a more flexible airspace design to accommodate traffic flows dynamically

GPI-9: Situational awareness

Scope:

- Operational implementation of data link-based surveillance to provide improved efficiency through reduced separation minima and increased capacity, reduced fuel costs and emissions and enhanced safety. The implementation of equipment to allow traffic information to be displayed in aircraft allowing implementation of conflict prediction and collaboration between flight crew and the ATM system. Improve situational awareness in the cockpit by making available electronic terrain and obstacle data of required quality.

GPI-10: Terminal area management

Scope:

- The optimization of terminal control area (TMA) capacity and efficiency, through improved management techniques, to provide for more fuel efficient aircraft operations and to minimize the effects of adverse events in the TMA

GPI-11: RNP, RNAV and standard routes

Scope:

- The optimization of terminal control area (TMA) capacity and efficiency to provide for more fuel efficient aircraft operations through the implementation of RNP and RNAV arrival and departure routes, standard instrument departures (SIDs) and standard terminal arrival routes (STARs)

GPI-12: Arrival Procedures

Scope:

- The optimization of terminal control area (TMA) capacity and efficiency to provide for more fuel efficient aircraft operations through optimized arrival procedures

GPI-13: Aerodrome Management

Scope:

- Improve capacity and efficiency through implementation of management strategies that improve movement area utilization

GPI-14: Runway Operations

Scope:

- Improve capacity through reduction of runway occupancy times

GPI-15: Match IMC and VMC operating capacity

Scope:

- Improve the ability of aircraft to manoeuvre on the aerodrome surface in adverse weather conditions

GPI-16: Integrated TMA and aerodrome management

Scope:

- Improve capacity and efficiency through integration of TMA and aerodrome management with respect to arrivals, departures and surface movement of aircraft

GPI-17: Decision support systems

Scope:

- To make optimum use of derived data to develop and implement decision support tools to assist air traffic controllers and pilots in detecting and resolving air traffic conflicts and in improving traffic flow

GPI-18: Implementation of data link applications

Scope:

- Increase the use of data link applications

GPI-19: Electronic Information Systems

Scope:

- The availability in real-time of quality assured electronic information (aeronautical, terrain and obstacle) to any ATM participant, anytime, anywhere

GPI-20: Meteorological systems

Scope:

- To improve the availability of meteorological information in support of a seamless global ATM system

GPI-21: WGS-84

Scope:

- The implementation of WGS-84 by all States

GPI-22: Navigation Systems

Scope:

- Enable the introduction and evolution of performance-based navigation supported by a robust navigation infrastructure providing an accurate, reliable and seamless global positioning capability

GPI-23: Communication network infrastructure

Scope:

- Timely availability of material for improving communication capabilities as a means of improving safety and efficiency in aviation as well as improving airspace and aerodrome capacity

GPI-24: Aeronautical Spectrum

Scope:

- Timely availability of adequate radio spectrum to provide viable air navigation services (communication, navigation and surveillance) on a global basis and thus improving safety and efficiency in aviation

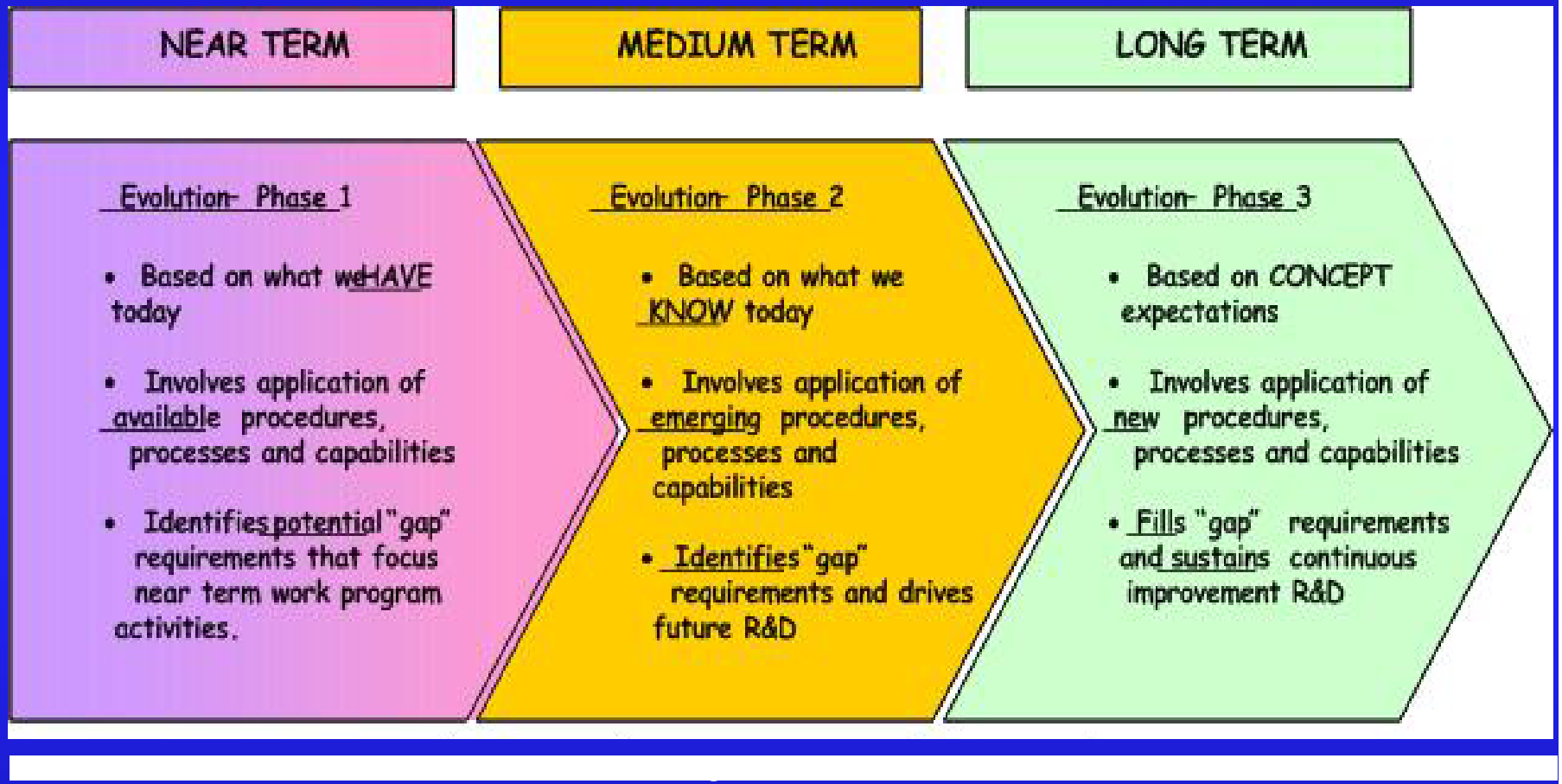
GPI-25: Stakeholder Commitment

Scope:

- Timely implementation by stakeholders of necessary infrastructure and equipage required to support the global plan initiatives

GLOBAL PLAN EVOLUTION

System Based → Performance Based



Thank You!