



ASSEMBLY — 37TH SESSION

TECHNICAL COMMISSION

Agenda Item 35: The global air traffic management (ATM) system

INFORMATION PAPER ON THE ACHIEVEMENTS OF THE KINGDOM OF SAUDI ARABIA (KSA) IN THE FIELD OF AIR NAVIGATION

(Presented by Saudi Arabia)

EXECUTIVE SUMMARY

This information paper sheds light upon the vital achievements in the field of air navigation made by the Kingdom of Saudi Arabia (KSA) seeking to improve air traffic management (ATM) and to ensure its safety and easy movement in the Saudi airspace.

1. INTRODUCTION

1.1 In view of the ever-increasing air traffic in the Kingdom of Saudi Arabia's (KSA) airspace, which led in turn to density of air traffic and increase of bottlenecks, KSA, keen on ensuring the safety of air traffic in its airspace and its smooth flow, implemented many modern projects to support and improve the performance of air navigation in the KSA, among the important of which are:

- a) establishment of two area control centres (ACC) in each of Jeddah and Riyadh;
- b) implementation of a local navigational communications network (NAN);
- c) installation of advanced surface movement guidance and control systems (A-SMGCS) at King Abdulaziz International Airport in Jeddah and King Fahd International Airport in Dammam; and
- d) implementation of a civil navigation reader system project (ACRC).

2. RETURN OF PROJECTS IMPLEMENTED FOR AIR NAVIGATION OPERATIONS IN THE KINGDOM

- a) ensuring the highest degree of safety and fluidity of air traffic;
- b) achieving the required expansion of the capacity of Saudi airspace;

* Arabic text provided by Saudi Arabia

- c) limitation of bottlenecks during peak hours in the airspace;
- d) establishment of air routes across the “Rub’al Khali” (the Empty Quarter) area using satellite technology; and
- e) attracting more users of Saudi airspace as the shortest and safest transit path.

3. **FUTURE PLANS AND ASPIRATIONS**

- a) action to provide ATM service in Saudi airspace by applying the highest international standards and using the most modern systems;
- b) expansion in the use of future air navigation systems through satellites; and
- c) continuation of keeping abreast of development and replacement of traditional systems by modern ones.

4. **OVERVIEW OF THE PROJECTS IMPLEMENTED**

4.1 Two ACCs in each of Jeddah and Riyadh:

- a) in view of air traffic density in Saudi airspace and the keenness of KSA to ensure safety and quick fluidity of air traffic all year long and every hour, therefore it established two regional centres to control air traffic paths within Saudi airspace; one of them in Jeddah to control and guide aircraft flying at low levels of the airspace located between 15 000 feet and 29 000 feet, and the other in Riyadh to control air traffic flying at high altitudes above 29 000 feet.

4.2 The most important characteristics of the system:

- a) each centre has been provided with main and standby systems in step with the latest technological developments used in ATM to ensure the provision of the best service to air traffic all year long and every hour; the system functions with high efficiency;
- b) each centre contains advanced computer systems working to process flight plans and radar information obtained from a radar network distributed Kingdom-wide to ensure radar coverage. The system is also connected to an advanced communications network formed of 42 remote-controlled air-ground communication stations (RCAGs) distributed in a deliberate manner to ensure communication with aircraft using Saudi airspace, besides the different airports in KSA and the regional control centres in neighbouring States, the system is also connected to other navigation instruments and systems such as:
 - 1) the meteorology headquarters systems to provide climate information;
 - 2) the aircraft diplomatic permit systems;
 - 3) the ATM systems and NOTAMs in neighbouring States; and
 - 4) the navigation charges collection systems;

- c) one of the most prominent characteristics of the system is that each centre supports the other in an integrated manner in emergencies, as the system feeds both centres at the same time with radar information obtained from all radars distributed Kingdom-wide, and processing systems also store all the centres' data to be used when needed, as the system automatically transfers the information and data of the defective centre to the another centre so that it alone carries out the task of controlling air traffic using Saudi airspace. It has to be mentioned that ATM systems are capable of interaction with present and future navigation systems via satellites, as they provide a tool of digital communication with aircraft flying in remote areas where no traditional means are available, in addition to the characteristic of providing ADS information similar to radar information for aircraft which transit those remote areas such as the Rub'al Khali, the system is also distinguished by a technical characteristic (CPDLC) which is used in remote areas without voice coverage so that communication with pilots can take place through electronic messages which attain the desired purpose.

4.3

A local navigation communications network (NAN):

- a) work is ongoing in the establishment of a national navigational communications network to connect all the Authority's navigation systems inside airports and remote areas with modern high-efficiency digital circuits to communicate voice and digital information between control units and air traffic using Saudi airspace. The system functions via a main and a branch network feeding four entries at the international airports in Jeddah, Riyadh, Dammam and Al Madina Al Munawwarah as well as an entry at the GACA in Jeddah. They are used for communication and processing of radar data, transmission of all sorts of voice navigational communications as well as passing of navigational information via satellites; and
- b) the network has the characteristic of reorganization and dispatch of navigation information to users through alternative paths in case of malfunction of one of its main parts which ensures continuity of non-stop service year round.

4.4

The advanced surface movement guidance and control system (A-SMGCS) project at the King Abdulaziz International Airport in Jeddah and the King Fahd International Airport in Damman (A-SMGCS):

- a) the project's most important objectives:

Provision of a surface movement guidance and control system for aircraft as well as equipment and vehicles working inside the aprons, aircraft parking areas beside the manoeuvring areas which include runways and surface paths to assist the surface controller and the tower controllers in guiding surface movement at airports to ensure the safety and fluidity of traffic at the airport. This provides better visibility at the airport and its surroundings even during bad weather conditions where horizontal and vertical visibility is reduced or non-existent because of fog or thunder and dust storms, enabling the air traffic controller to deal with and control surface movement of aircraft and equipment with full accuracy.

- b) the project's main elements:

- 1) surface movement radar system;

- 2) local-area multilateration system, in addition to a wide-area multilateration system; and
- 3) radar data analysis and automatic connection systems.

4.5 Civil navigation radar system (ACRC):

- a) this project is implemented to provide the Authority with a modern civil radar system to enable it to cover Saudi airspace; and
- b) the project includes the installation of 21 radars functioning to ensure full coverage of all the Kingdom's airspace. They are designed to fulfill the requirements of application of the minimum vertical and horizontal separation of aircraft, procedures and norms adopted by ICAO, in order to achieve the required expansion of capacity of Saudi airspace and thus avoid traffic bottlenecks which occur to aviation traffic when it passes through Saudi airspace.

4.5.1 The most important systems and services provided by the project:

- a) systems of advanced monopulse secondary surveillance radars (MSSR) functioning on Mode-S;
- b) systems of advanced manoeuvre and approach radars (TMAR) for use in international airports at each of:

Jeddah, Riyadh, Dammam, Al Madina Al Munawwarah, in addition to the Abha Regional Airports;
- c) advanced systems for monitoring, analysis and processing of radar data;
- d) satellites for automatic connection with traditional and future ATM systems through satellites;
- e) a surveillance and remote control system to follow-up the performance of the various radars placed on the air routes;
- f) provision of a training system at the Saudi Academy for Civil Aviation in order to train specialized technical cadres from among the Authority's affiliates to operate and follow-up the performance of the radar systems; and
- g) provision of a radar system maintenance centre for the third level at the central workshop in Jeddah and provision of technical support services to the Authority for 15 years.

5. **CONCLUSIONS**

- 5.1 The Assembly is invited to examine the contents of this information paper.