

FOURTH MEETING OF THE ALLPIRG/ADVISORY GROUP

(Montreal, 6 – 8 February 2001)

Agenda Item 3: Coordination of CNS/ATM partners' planning and implementation efforts

ACTIVITIES IN THE FIELD OF CNS/ATM IMPLEMENTATION IN THE RUSSIAN FEDERATION

(Presented by the Russian Federation)

INFORMATION PAPER

SUMMARY

This paper presents the results of the CNS/ATM activities in the Russian Federation.

1. INTRODUCTION

This information paper describes the following issues concerning CNS/ATM field:

- the experimental operation of an air traffic controller workstation with ADS/CPDLC
- functions (ATC-ADS/CPDLC workstation) installed at the Magadan area control center (ACC);
- the experimental work on ADS-B field;
- the works on experimental non-precision approach (NPA) operations of aircraft using satellite navigation system.

2. DISCUSSION

2.1 The experimental operation of an air traffic controller workstation with ADS/CPDLC functions

During the period from April till June 1999, 16 flights were made using CNS/ATM technology along the A218 route via the Russian airspace.

2.1.1 Flight planning and organization

CNS/ATM flight planning was done by delivering the flight plans to the Magadan ACC and the Magadan auxiliary zone center (AZC). The flight plans came in on time in accordance with current procedures.

2.1.2 Radio engineering flight support

During the period under review, Magadan ATC-ADS/CPDLC workstation software worked steadily and no malfunctions were recorded.

At the same time there were several failures of the leased Magadan-Anchorage data link circuit. The instability of the circuit operation was caused by technical reasons such as low elevation angle of “Statsionar-16” satellite for the ground earth station in Anchorage which resulted in mitigation of the signal in the troposphere. For this reason a number of flights using CNS/ATM technology originally planned for A218 route were canceled and the flights were redirected to B337 route with conventional technology.

2.1.3 Flight operations

The service for air traffic on A218 air route was provided from Magadan ATC-ADS/CPDLC workstation in accordance with developed and approved guidance documents. CNS/ATM technology applied on the entire route portion under responsibility of the Magadan ATC-ADS/CPDLC workstation controller from GONAM to GUBAT reference point.

Interaction of Magadan ACC and Magadan AZC was in accordance with “The Temporary Interaction Guidance for Magadan ATC-ADS/CPDLC Workstation Controller and ACC Controllers of the National ATM System”. During the period under review no Guidance violations took place. Flight safety was provided.

The analysis of the flights using CNS/ATM technology resulted in the following conclusions.

- CNS/ATM controller is capable to provide surveillance and to control FANS-I equipped aircraft irregardless of its current location;
- CNS/ATM controller has on his display all necessary data on aircraft under control during all flight.
- CNS/ATM controller is enabled to continuously exchange messages, instructions and free text information with crews and to have message exchange history on his CPDLC display and simultaneously to make records in monitoring protocol;

It was collected CPDLC message statistics. Message time delivery analysis is due after the second phase of the experimental operation.

2.1.4 At present Magadan- Anchorage data circuit is built. VSAT station is installed in Magadan and Magadan-Seattle circuit using Intelsat satellite is operational. It is linked up to Annapolis through a telecommunication provider. Tests proved the high quality of telecommunication. ATC-ADS/CPDLC controller workstation moved to a new Magadan ACC building. Trail plan for the second phase of the experimental operations developed. Documentation is prepared for certification of the ATC-ADS/CPDLC

workstation by the Interstate Aviation Committee. The flight trials are in progress now and the workstation is to be put into regular operation on the next year after the full commissioning and certification. Also it is to be used to provide CNS/ATM ATS on cross-polar routes, bridging North America and South-East Asia.

2.2 The experimental work on ADS-B field.

Broadcast automatic dependent surveillance (ADS-B) is one of the most promising types of surveillance and complies to the ICAO concept of the future air navigation system. In line with this concept ADS-B is considered one of the main surveillance methods for the ATM system of Russia.

In view of conditions under which Russian ATM system is operating and the intention to harmonize it with the global one starting with the European system, a joint decision by the Federal Aviation Authority of Russia (FAAR) and some other interested organizations has been made “On organization of experimental work in the field of promotion of VHF data link, mode – 4 in the interests of ADS-B and other ADS applications for ATM purposes” in which VHF data transmission channel is considered to provide the most rational means of transition to a future Russian ATM system.

2.2.1 ADS-B implementation project in Tyumen region.

A project to operate an ADS-B experimentally by means of “Tyumenaerocontrol” regional state enterprise on ATC and air space use has been prepared and is to be implemented in the following two years aimed at establishing surveillance and air traffic control in the area control centre (ACC), aerodrome control centre the local control centre. The purpose of the project is to assess advantages which ADS-B gives to ATM system, airlines and respectively equipped aircraft.

As part of the project it is planned to assess the air traffic control (ATC) technology and the operational procedures for aircraft crews using ADS-B as an additional means of air traffic control as well as to finalize the equipment certification procedures.

An important part of the project is assessing the application of ADS-B for the purpose of supporting helicopters operations in areas with no ATC radar coverage.

At present specifications have been developed and adopted by SCAA for the development and implementation of ADS-B system in the Tyumen region. The industry has started working. According to SCAA plans system installation is to begin in early 2001 followed by operation tests.

2.2.2 Implementation of other ADS-B projects.

It is supposed that implementation of the following similar systems is to begin in other regions of Russia starting from 2001:

- Automated surface movement guidance and control system at Moscow Domodedovo Airport (A-SMGCS);
- ADS-B surveillance system for air traffic control in Moscow airspace below the lower flight level.

2.3 The works on experimental non-precision approach (NPA) operations of aircraft using satellite navigation system.

Utilization of satellite navigation system is one of the main components of the ICAO CNS/ATM concept. At present GNSS Panel has completed its work on SARPs and guidance materials for global navigation satellite system (GNSS). Since 1998 Russian Federation have carried out works on experimental non-precision approach (NPA) operations of aircraft using satellite navigation system. The operations is conducted in Samara at Kurumoch international airport with participation of Lufthansa and Samara Airlines.

2.3.1 In the process of the experimental operation the following tasks were completed:

- Approach and NPA schemes were developed for Kurumoch airport in accordance with ICAO 8168 PANS-OPS, vol. II, chapt.33, para 33.1.4;
- Guidance on NPA at Kurumoch airport using GNSS was developed;
- An addition to radio exchange phraseology concerning GNSS NPA was developed for crews and controllers;
- TU-154M aircraft of Samara Airlines was upgraded for GNSS NPA.

By the time over 30 approaches was made by Lufthansa A-310 and A-320 having FMS on board, which proved the validity of the developed schemes, approach accuracy for the airport minimum requirements (200x2500) and the developed procedures of controllers and crews interaction.

The experimental operations resulted in the order by FAAR ¹ 225 of 17.07.2000 on updating “The Guidance on Airport Schemes and Assigning of Safe Altitude” defining the methodology for approach schemes calculation using GNSS-based RNAV. This gives the opportunity to implement GNSS NPA into Russian civil aviation operations.

2.3.2 The GNSS approach schemes for Kurumoch airport have been published in AIP of the Russian Federation. Luftgansa Airlines has got a permission to use NPA schemes in the Kurumoch airport. The experimental operation of TU-154M aircraft with Allied Signal KLN-90B receiver on board has been started. On the next year will be realized the flight testing by the implementation of NPA schemes with vertical guidance (NPV-1 and NPV-2).

2.3.3 The Factory Acceptant tests (FAT) are now on the final stage. At the beginning of the next year the Site Acceptant tests (SAT) and the Flight tests will start. After trails and certification of ICAO SARPs compliant GBAS are completed experimental CAT-I approaches using GNSS is to be started. GNSS-based approach is supposed to be used at alternative and emergency airdromes along cross-polar routes.

3. CONCLUSIONS AND RECOMMENDATIONS

ALLPIRG is invited to take into consideration this information on the activities of Russian Federation in implementing ADS/CPDLC workstation operation, ADS-B experimental work, and implementation of GNSS applications.