

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

Agenda Item 6: Aeronautical navigation issues

6.1 Global navigation satellite system (GNSS) development status based on : reports from States, service providers and industry organizations

CURRENT STATUS AND PLANS FOR THE DEVELOPMENT OF THE GLONASS SYSTEM

(Presented by the Russian Federation)

SUMMARY

This paper presents information on the current status and plans for the development of the GLONASS system for the purposes of planning further GNSS-related activities.

1. INTRODUCTION

1.1 The GLObal NAVigation Satellite System (GLONASS) developed in the Russian Federation was offered in 1996 to civil users as one of the basic elements of the GNSS system. The Council of ICAO accepted this offer in the same year.

1.2 The GLONASS system was offered to civil users on a cost-free basis for 15 years.

2. DISCUSSION

2.1 The space segment of the GLONASS system presently consists of 11 satellites, eight of which operate without restrictions. The reason for this state of affairs is the absence of sufficient funding in the years 1996 to 2000.

¹ Russian version provided by Russian Federation.

2.1.1 In August 2001 the Government of the Russian Federation adopted a long-term federal special programme “Global Navigation System” (hereinafter called the Programme) which opens up encouraging prospects for maintaining and developing the GLONASS system.

2.1.2 The Programme is designed for 10 years and it already made a successful start. Rosaviakosmos is the coordinator of the Programme as a whole and it ensures the coordinated use of the GLONASS system in the interests of different users, including aviation users.

2.2 In 2002 and 2003 sufficient funding was obtained to continue the work on the development of the new-generation satellite GLONASS-M (a GLONASS-M satellite will be launched together with two GLONASS satellites in the fourth quarter of this year from Baikonur Cosmodrome).

2.2.1 During the implementation of the Programme, it is planned to develop an even more advanced satellite GLONASS-K with a lifetime of 10 to 12 years and improved accuracy performance.

2.2.2 The GLONASS-K satellite will be considerably lighter than existing versions with a mass of around 700 kg. This will make it possible to launch these satellites with both the Proton launch vehicle (six satellites per launch) and the Soyuz launch vehicle (two per launch). This will make it possible to reduce by several times the costs of deploying and maintaining the orbital segment of the GLONASS system.

2.3 The following activities should be carried out during the implementation of the Programme: scientific research and experimental design work, ground experimental finalization and flight developmental testing of future navigation spacecraft, modernization of the ground navigation system control complex, deployment of the orbital segment in its proper structure, deployment of the production of navigation user equipment and of means for the augmentation of the GLONASS system. With regard to the orbital segment, the Programme has the following main phases:

Phase 1: In 2006 the orbital segment will be increased to 18 satellites, some of which will be GLONASS-M satellites with an increased lifetime and improved performance.

Phase 2: After 2006 the orbital segment will be deployed and maintained at the level of 24 satellites by launching GLONASS-K satellites.

2.4 In accordance with existing agreements on ensuring the electromagnetic compatibility of the GLONASS system with radioastronomy facilities and mobile satellite services, work will continue on the phased transition of the satellite radiation to the lower part of the occupied frequency sub-bands L1 (1 600 MHz), and L2 (1 200 MHz) in accordance with the schedule for the phased transition that was announced earlier. Furthermore, on the GLONASS-K satellites it is planned to have navigation signal radiation in the third frequency band L3 (1 100 MHz), for which the corresponding application has been made to the ITU.

2.5 The recent decisions of the Government of Russia on the GLONASS system and the progress in the implementation of these decisions create the possibility to develop and maintain the GLONASS system in a structure sufficient for use by civil aviation.

2.6 The GLONASS system is also being developed in combination with other navigation satellite systems and this considerably increases GNSS performance: the accuracy, integrity and reliability of navigation services to users.

3. **CONCLUSION**

3.1 The conference is invited to note the information provided in this paper on the GLONASS system.

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