ANSConf-WP/103
19/6/00
ITEM 3 & 5.2

CONFERENCE ON THE ECONOMICS OF AIRPORTS AND AIR NAVIGATION SERVICES

(Montreal, 19 - 28 June 2000)

Agenda Item 3: Funding issues
Agenda Item 5.2: Elements for consideration with regard to ICAO policy

GNSS DEVELOPMENT AND COST RECOVERY

(Presented by the United States of America)

SUMMARY

Over the last decade the use of a Global Navigation Satellite System (GNSS) as the primary means of providing civil worldwide navigation for aircraft has been an area of extreme interest and growing acceptance within the aviation community. Currently, GNSS is based on the U.S. Global Positioning System (GPS) and the Russian Global Navigation Satellite System (GLONASS). Both systems provide the basic signal free from any direct user charge. As technologies continue to develop and the trend toward greater reliance on satellite-based navigation grows, other satellite systems may be implemented, such as the proposed European satellite system, GALILEO. The U.S. will continue to provide the signal/signals free from any direct user charge and encourages other States to adopt a similar philosophy to ensure that the maximum economic efficiency of these technologies be realized. Despite the clear economic benefits of this approach, some States may eventually opt to recover the cost of system development or maintenance or its augmentations through some form of related user charge. The derivation and application of such charges raise a number of concerns as they pertain to ICAO's cost recovery principles.

The Conference is invited to examine whether the public good nature of GNSS is sufficient to encourage States and associated service providers not to directly charge the aviation community for the use of GNSS. The paper also invites the Conference to call upon States that plan to develop components for GNSS to develop them in a single, open architecture, so as to avoid requirements for dual equipage of equipment. Finally, the Conference is invited to examine the concerns related to cost allocation and recovery.

1. Introduction

1.1 Over the last decade, the use of a Global Navigation Satellite System (GNSS) as the primary means of providing civil worldwide navigation for aircraft has been an area of extreme interest and growing acceptance within the aviation community. Currently, GNSS is based on the U.S. Global Positioning System (GPS) and the Russian Global Navigation Satellite System (GLONASS). As technologies continue to develop and the trend toward greater reliance on satellite-based navigation grows, other satellite systems may be implemented, such as the proposed European satellite system, GALILEO.

1.2 Using GNSS, an aircraft could be guided from departure, en route, to landing without the assistance of other navigation systems. However, in order to assure the desired precision and reliability for use as primary navigation, the satellite signal or signals may require augmentation. Such augmentation improves the accuracy, integrity, availability, and continuity of the signal. For example, the FAA has been developing a Wide Area Augmentation System (WAAS) to improve the accuracy and reliability of the basic GPS signal for flight operations down to CAT I approaches. Similar developments have occurred with regard to Local Area Augmentation Systems (LAAS) to ensure that the added accuracy and integrity needed to support CAT II/IIIB precision approaches will be in place.

2. Discussion

2.1 The United States believes that a fully developed GNSS based on GPS and its related augmentations (such as WAAS, LAAS, the European Geostationary Navigation Overlay System (EGNOS), and the Japanese Multi Transport Satellite Augmentation System (MSAS)) could effectively meet the needs of global aviation users. The United States is working with ICAO to develop a set of standards and recommended practices for GNSS. To support this international effort, which would utilize GPS technologies, using GPS time, geodesy, and a common signal structure, the United States Government provides the signal or signals (as well as augmentation to the signal(s)) free of any direct user charge. Furthermore, the U.S. believes that national economies will benefit most if the development and implementation of GNSS is conducted based on an open architecture, one that is free from direct user charges.

2.2 However, some States may favor the development of a GNSS system independent of GPS or GLONASS. The financing of such a system is a matter of considerable concern to the airline industry and to the United States. Of equal concern is the apparent desire by some States to establish direct charges for certain augmentations to the signals.

2.3 In particular, with respect to the financing of items such as an independent GNSS or GPS/GLONASS augmentations, some States may opt for a related user charge. In addition to the likely negative impact of such an approach on economic efficiency and the growing use of this important form of safety-related services, the application of such charges raises a number of concerns as it pertains to ICAO's cost recovery principles. First, it is recognized that States must be able to obtain financing for system development (possibilities include debt financing, direct government contributions, equity financing, and leasing). ICAO guidelines discourage the use of user charges to accumulate a development fund ("forward financing"). Instead, ICAO guidelines advocate the funding of projects from loans or government funds. These funds may be repaid through user charges upon introduction of service. States should not require users to pay for GNSS services prior to the actual provision of services. Secondly, if States opt to charge for service, they must be able to appropriately identify users (aviation and non-aviation users) of the signal or signals and their various augmentations. Any charges for the system would then need to be allocated among user groups based on a rational, equitable, and verifiable basis, recognizing that certain elements of the system (and related costs) may be largely [primarily] driven by [developed for] aviation or other users communities. Differences in required levels of service must be reflected in the user charge system. For example, within the aviation

community, the use of GNSS will vary depending on type of user and the nature of the flight. General aviation users may require only a basic signal or signals; commercial en-route users may require an augmentation to the signal or signals, while terminal operations may require yet additional augmentation.

2.4 Prior to establishing any type of GNSS cost recovery system, States must recognize and understand the wide-spread use of GNSS. Civil aviation constitutes a small, though important, share of navigation satellite users. Other major users of GNSS include the military forces, the maritime industry, the trucking industry, surveyors, providers of customs and police services, the forestry industry, the agricultural industry, those undertaking positioning for environmental purposes, etc. In any cost recovery system, to the extent feasible, each user group should be allocated a portion of the State's GNSS costs based on system requirements and usage, and users should not pay more than their fair share of these costs. Component development or system augmentations benefitting only one user group may be allocated in its entirety to that group, but any charges for augmentations which benefit multiple user groups should be allocated based on each group's relative use of the system or its components.

3. Action by the Conference

3.1 The Conference is invited to examine the economic benefits of a GNSS developed and implemented free from any direct user charges. In addition, States are invited to consider the safety implications associated with the imposition of direct charges for GNSS. The Conference is also invited to call upon States that plan to develop components for GNSS to develop them in a single, open architecture so as to avoid requirements for dual equipage of aircraft. States should be encouraged to fund system development through traditional financial means. Forward financing based on direct user charges should be avoided.

3.2 Once a component of GNSS is developed, if States opt to recover the cost of the system or its future augmentation through various user charges, these charges need to be based on an appropriate allocation of GNSS costs among all users. The Conference is therefore also invited to examine:

a) how States might allocate GNSS costs among various user groups and subgroups;

b) how States might establish appropriate aviation charges for GNSS (direct or indirect) given that the level of service that each user receives may differ significantly; and

c) whether current ICAO guidelines found in *Statements by the Council* and the *Manual on Air Navigation Services Economics* set forth charging principles in sufficient precision to allow for the recovery of GNSS costs, or whether supplemental guidelines are needed.

— END —