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CONFERENCE ON THE ECONOMICS OF AIRPORTS AND AIR NAVIGATION SERVICES

(Montreal, 19 - 28 June 2000)

Agenda Item 4: Determinants of the economic regulation of airports and air navigation services

Agenda item 5.2: Elements for consideration with regard to ICAO policy

THE ALLOCATION OF GNSS (GLOBAL NAVIGATION SATELLITE SYSTEMS) COSTS

(Presented by the European Organisation for the Safety of Air Navigation EUROCONTROL[1])

SUMMARY

This paper describes recommended methods for the allocation of the GNSS costs between civil aviation and other user categories, between phases of flights, and between States.

The Conference is invited to recommend that ICAO, in its future work on the allocation of GNSS costs, takes this work into account.

1. Background

1.1 The use of satellites for the provision of "gate to gate" Air Navigation Services will be one of the most important, promising and complex issues for civil aviation in the years to come.

1.2 In May 1996, ICAO's Air Navigation Services Economics Panel (ANSEP) released Document 9660 "Report on Financial and related organisational and managerial aspects of GNSS provision and

[1] The EUROCONTROL Organisation comprises 29 Member States in Europe and an Agency. The Member States are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Moldova, Monaco, Netherlands, Norway, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

operation". On 11-15 May 1998, ICAO convened a World-wide CNS/ATM Systems Implementation Conference in Rio de Janeiro, focusing on institutional, legal and financial matters. It adopted Recommendation 3/16 which reads as follows:

"That ICAO :

a) address, as a matter of urgency, the issue of cost-allocation amongst all users of GNSS;

b) …"

1.3 In parallel the European Community launched a European Strategy for Global Navigation Satellite Systems, in January 1998, embracing two successive phases of a Trans-European GNSS, i.e. GNSS-1 (EGNOS : European Geostationary Navigation Overlay System) and GNSS-2 programs.

1.4 The EUROCONTROL States acknowledged the importance of the issue in this European context and set up a Task Force in November 1998 with the aim of developing methods for:

a) the allocation of GNSS costs between civil aviation and other user categories, and
b) the allocation of civil aviation costs between States and between phases of flight (en-route vs. approach/aerodrome)

1.5 This initiative was supported by the international user organisations (in particular IATA, IACA, and IAOPA).

1.6 The Task Force worked in close contact and collaboration with the ICAO Secretariat and the European Commission, and both attended the Task Force's meetings.

1.7 The findings of the Task Force are supported by EUROCONTROL and by the above-mentioned user organisations. They are in full compliance with the ICAO cost allocation principles, and in particular with Paragraph 32 of the Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services which recommends that "*international civil aviation should not be asked to meet costs which are not properly allocable to it*".

1.8 The EUROCONTROL States are aware that they represent a highly developed geographical area, where more sophisticated methodologies may be applied. The aim of this document is to present robust, equitable and justifiable recommendations which could be applied world-wide.

2. Working method

2.1 With a view to ensuring a fair cost-allocation amongst all users of GNSS, and to avoiding that the civil aviation would have to meet costs which are not properly allocable to it, the EUROCONTROL States :

a) considered the possible methods[2] for allocating costs to civil aviation and other categories of users, and defined evaluation criteria[3] ;
b) assessed each method against each criterion, resulting in the selection of the preferred method.

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[2] After a first discussion, the short list of methods analysed included: Number of users, direct benefits, infrastructure savings, requirements-driven method.

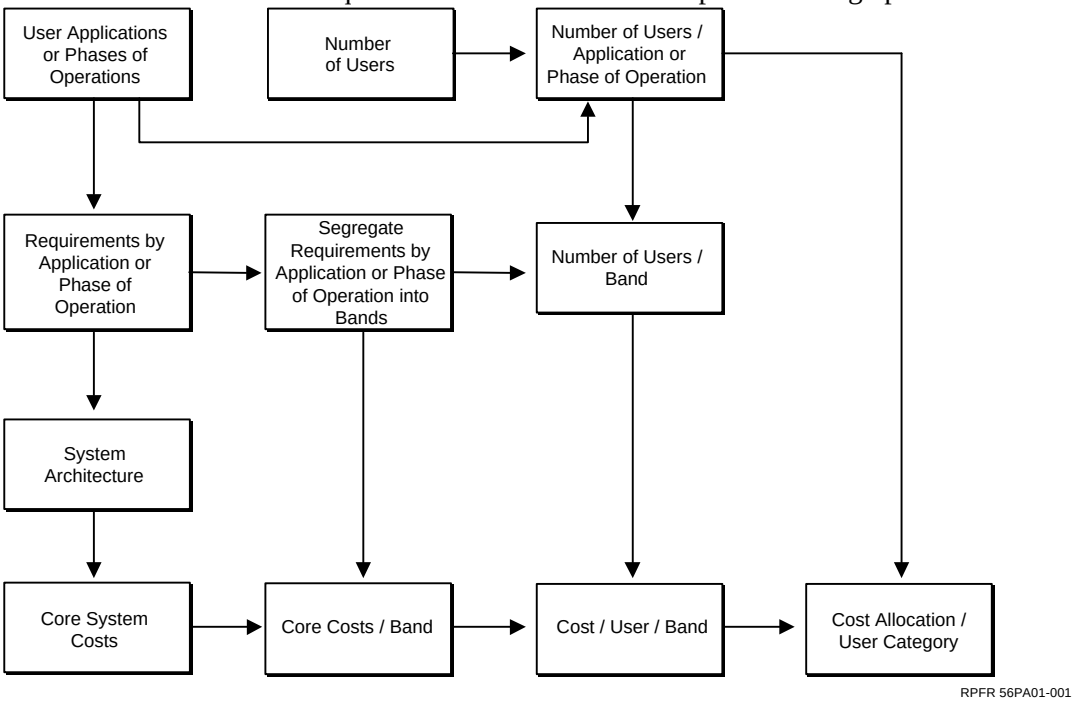
[3] Simplicity, cost-relatedness, operational and technical requirements considered, transparency, and consistency of results.

2.2 The **"requirements-driven method"** resulted as being the preferred cost-allocation method, and is therefore submitted for the Conference's consideration. The complete study is available upon request.

3. Outline of the requirements-driven method

3.1 The **"requirements-driven method"** is based upon requirements of various users for their applications and/or phases of operation. These requirements drive specific architectures, which can be costed, in an incremental fashion based upon the actual costs to provide a level of service. This method is a multi-step cost allocation process which incorporates the number of users, the users' requirements by phase of operation or application and the incremental costs to provide varying levels of service across such diverse requirements.

3.2 The requirements driven method commences with the users' requirements by phase of operation or application. These requirements are analysed and harmonised into a common set of service levels ("requirements bands")[4]. In order to determine how to allocate the core system costs by service level, the incremental costs of providing this level of service must be determined. Once this is complete, a determination of the number of users (platforms) by service level is necessary. Once this is complete, the number of users (platforms) by service level and core GNSS costs by service level can be used to allocate core GNSS costs to the user communities. The requirements driven method is depicted in the graph below.



4. Results of the requirements-driven method for the allocation of GNSS costs between civil aviation and other user categories

4.1 Within the European Commission's GNSS Cost Benefit Analysis Project, the costing of a full future GNSS constellation, including operations, was undertaken. It was estimated that the cumulative core GNSS cost amounts to approximately 3 Billion Euros up to the year 2010.

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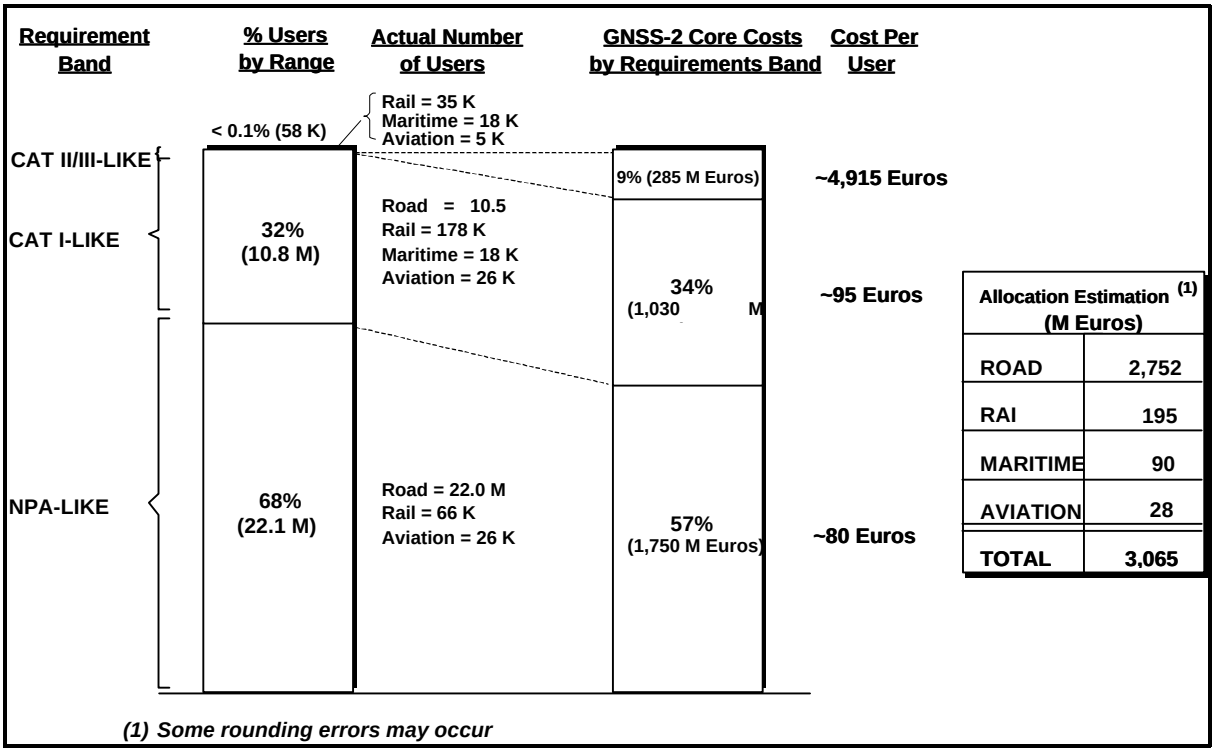
[4] The allocation of GNSS costs to the requirements bands is facilitated by the selection of three bands, i.e., NPA-like, CAT I-like, and CAT II/III-like operations, since design, certification and operational principles surrounding these operations are well known.

4.2 Using the costs of the system architecture separated into the levels of capability (which correspond to the "requirements bands"), the number of estimated users in Europe can be used to allocate costs to each user group. This is shown in the exhibit below.



5. The use of the requirements-driven method for allocating costs between phases of flights and between States

5.1 The same method could be used for the allocation of costs between phases of flights (i.e. en route vs. approach / aerodrome) and between States.

5.2 The exhibit above allows the separation of costs allocable to the en-route segment of the flights (i.e. requirement band "NPA-like") from those allocable to approach/terminal phases (requirement bands "CAT I-like" and "CAT II/III-like").

5.3 This way, the GNSS costs could be allocated first according to the phases of flight, and then between States. Consequently, the allocation of costs could be as follows:

a) The GNSS costs allocable to the en-route phase of flights would be allocated to the States or, where appropriate, to the providers of en route Air Traffic Services;

b) The GNSS costs allocable to the approach/aerodrome phases of flights would be allocated to the service providers (States or Air Traffic Service Providers and/or airports, depending on national situations and practices).

5.4 The allocation keys could be :

a) For the en-route part: The best cost-related allocation key would be “time spent” in the system. However, as this is difficult to implement, the kilometres flown can be taken as a good, simple and reliable proxy. Furthermore this would be in line with ICAO recommendations.

b) For the approach/terminal part: The costs are not directly linked to the time in the system or the distance flown. Therefore the preferred allocation key would be the number of movements in the TMAs. This would also be in line with ICAO recommendations.

6. Conclusion

6.1 EUROCONTROL believes that the “requirements-driven method” constitutes an appropriate method for allocating the GNSS costs

- between civil aviation and other user categories
- between States, and
- between phases of flight (en-route vs. approach/aerodrome).

6.2. It is understood that these results need to be shared and discussed in the appropriate instances to arrive at an agreeable solution.

7. Recommendation

7.1 The Conference is invited to recommend that ICAO, in conducting its study on the allocation of GNSS costs, takes into account the work carried out by EUROCONTROL on this subject area.

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