



**WORKING PAPER**

**ASSEMBLY — 37TH SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 41: Support of the ICAO policy on radio frequency spectrum matters**

**SPECTRUM ADMINISTRATIVE INCENTIVE PRICING, TRADING AND AUCTIONING,  
RATIONALIZATION OF SPECTRUM LICENSING AND ASSEMBLY RESOLUTION A36-25**

(Presented by Canada)

**EXECUTIVE SUMMARY**

This paper introduces some of the elements in the trends by States planning implementation of administrative incentive pricing (AIP) on spectrum and highlights the potential impact on the aviation industry. Spectrum is a highly valuable and limited resource; new market mechanisms are driving the need to manage the resource in different ways as demand continues to increase and shortages are expected. Spectrum auctioning has become an innovative tool to ensure access to spectrum when there is a high demand. It results in establishing a high monetary value for spectrum when the auctions are successful. These auctions also impact the monetary value considered in AIP. It also highlights the enhanced need for civil aviation administration (CAA) support for the work of ICAO as outlined in Assembly Resolution A36-25.

**Action:** The Assembly is invited to:

- a) consider the information in this paper regarding how spectrum resources could be managed in the future, and that this trend is widening to other States;
- b) consider the impact to the aviation industry as spectrum resources become constrained due to market forces, higher cost of AIP and expected shortages due to increasing demand;
- c) reinforce the intent of Assembly Resolution A36-25 furthering the importance of CAAs to support the work of ICAO towards protection of required spectrum resources globally used by aviation through an Assembly recommendation; and
- d) consider the need to develop a long-term spectrum strategy.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objectives A, D and E on safety, efficiency and continuity.
<i>Financial implications:</i>	Resources for the activities referred to in this paper are included in the proposed budget for 2011 to 2013.
<i>References:</i>	<ol style="list-style-type: none"><li>1. <a href="http://www.icao.int/anb/panels/acp/wg/w/wgw3/ACP-WGW03-WP02_FrequencySpectrumPlanningConsiderations_rev2.doc">http://www.icao.int/anb/panels/acp/wg/w/wgw3/ACP-WGW03-WP02_FrequencySpectrumPlanningConsiderations_rev2.doc</a></li><li>2. <a href="http://www.icao.int/anb/panels/acp/wg/f/wgf21/ACP-WGF21-IP16-AIP%20UK%20update.ppt">http://www.icao.int/anb/panels/acp/wg/f/wgf21/ACP-WGF21-IP16-AIP%20UK%20update.ppt</a></li><li>3. Doc 9902, <i>Assembly Resolutions in Force</i> (as of 28 September 2007)</li></ol>

## 1. INTRODUCTION

1.1 For as long as we can remember, management of radio frequency spectrum has traditionally been achieved through established regulatory frameworks of government bodies, in most States typically known as “radio regulators”. In more recent years a different focus on how spectrum is managed has taken place. In particular, it has been recognized that spectrum resources are highly valuable and very limited in availability, thereby needing a very novel regulatory mechanism or structure to effectively manage the resources. The once “simple but efficient methods for that time period” of spectrum management are extensively undergoing scrutiny and review. Current market trends and forces are driving the need for regulatory change. The government bodies and regulatory agencies of many States are being forced to amend their regulatory frameworks in an effort to better manage spectrum resources that are increasingly becoming very limited due to growing demand from many services, in particular the need for contiguous spectrum to provide “broadband” services.

1.2 The availability of spectrum resources for civil aviation is a highly critical need and requirement. Without adequate spectrum, which is the backbone of our global industry, civil aviation would not be possible. Most of the spectrum used by aviation is available in “protected” frequency bands that are afforded special regulatory measures in the International Telecommunication Union (ITU) Radio Regulations. However, aviation as an industry also has an increasing need for additional spectrum for the implementation of emerging technologies such as digital future communications systems.

1.3 Within the traditional frequency bands used by aviation, there are conditions of sharing between aeronautical services or systems. An example of this would be a VHF omnidirectional radio range (VOR) sharing with ground-based augmentation system (GBAS) in the same band, or distance measuring equipment (DME) sharing with tactical air navigation (TACAN), or even radionavigation satellite service (RNSS) in the DME band. These examples are given to highlight the fact that sharing has been necessary to increase efficient use of limited spectrum resources and in some measure for aviation to have some control over the type of service to share with or without compromising safety practices or standards.

1.4 More recently, sharing conditions are being proposed by non-aeronautical services looking at using aeronautical bands that are of great concern to the aviation community. In the ITU, there are multiple studies underway to find spectrum for non-aeronautical services. In addition to these concerns, the traditional ways in which radio regulators manage spectrum resources is undergoing change due to forces of market mechanisms, the need for quicker reaction to invoke regulatory change, to better serve public interest, and acknowledgement of the high valuation and marketability of spectrum resources.

1.5 Clearly, we have entered a new world of business marketing, strategy management, and dynamic change in traditional regulatory frameworks, collectively all of which acknowledge the extreme value of spectrum resources. To put this in perspective, Canada recently auctioned a few MHz of spectrum for mobile phone use which netted \$4.2 billion CDN.

1.6 It is likely we will experience the changing trends in spectrum management through implementation of administrative incentive pricing, auctioning, rationalization of licensing fees and spectrum trading.

## 2. DEFINITION OF TERMS

2.1 “Administrative incentive pricing (AIP)” is the term given to establishing monetary charges for spectrum holdings that adequately reflect the value of the spectrum to ensure efficient use by a service whereby the service gives back what it does not use by reason of affordability. This topic is discussed further in this paper.

2.2 “Auctioning” is the term used when specific blocks or allocations of spectrum are formally placed for auction to the highest bidder. Accepted highest bidder or consortium of bidders then have the right to utilize that spectrum in accordance with appropriate regulations or any constraints in place at the time of auction. In this paper it is not discussed further.

2.3 “Rationalization of licensing” is the term used when specific restrictions or conditions are removed from licences to allow the licence holders greater flexibility to change or modify how they use the spectrum. In this paper it is not discussed further.

2.4 “Spectrum trading” is the term used in scenarios where holders of spectrum licences are allowed to trade rights and obligations to another person. Trading may be partial, total, outright etc. In this paper it is not discussed further.

## 3. THE DIFFERENCE OF AIP

3.1 Under traditional licensing conditions, the cost of a licence for a service is usually fixed. For example, an aeronautical service as a DME, VOR or radar may be \$150 per license per year, whereas under the AIP scenario, the license cost would increase dramatically due to the fact that the license is based on bandwidth requirement of the service, usually on a per MHz basis. Some aeronautical system licenses would increase moderately whereas others could increase exponentially due to their bandwidth requirements, for example a radar requiring several MHz could have a licence cost of several hundred thousand dollars, per radar, per year. The actual cost would be subject to the amounts outlined in a framework agreement. One can see from the concept of AIP that considerable cost burden would be placed on the provider of those aeronautical services, a burden such that cost recovery would become necessary to offset the actual cost of providing the service (*see Reference 2*).

3.2 Aviation is based on the concept of global interoperability in the deployment of services and systems to ensure safety obligations can be consistently met. Spectrum resources used to support aeronautical systems are in global assignments or allocations made by the ITU. The concept of AIP however is not global. Currently, it is the decision of an individual State to implement the pricing framework for licensing within its sovereign territory.

3.3 The potential exists for significant disadvantages to arise from the implementation of AIP within a given State. The aviation sector within any State is not structured to undertake such radical changes to licensing costs for provision of navigation, communication and surveillance (CNS) services. When a CAA or service provider imposes cost recovery, it would naturally place an unfair additional cost burden on the airlines, who in turn would offset their higher operating costs through ticketing charges. It could be a growing scenario of decreasing profit margins, a scenario the aviation industry would have extreme difficulty to accept.

3.4 The concept of AIP is to promote efficient spectrum resource usage. There are many examples of efficiencies and inefficiencies by non-aviation services. There are situations where spectrum warehousing occurs and the inter-relationships between businesses to protect one another such that spectrum for use by other services is not available. Following on from this, could this suggest that the aviation sector needs to also review how efficient or inefficient it is when using spectrum resources?

3.5 By legacy we cannot escape the fact that essential safety services must be provided to ensure the global provision of CNS services. We must also take into account emerging technologies in the aviation sector that require additional spectrum resources, however, this should not diminish the need for aviation to take a close review of what services are needed in the longer term and those services that may not. A review of this nature would be beneficial in identifying in the longer term where licensing of certain systems could be revoked, thus allowing for improved efficiency under implementation of AIP and its associated increased licensing costs.

3.6 Civil aviation by tradition operates on a global basis supported by interoperability, international standards and practices. These standards and practices are not subject to overnight change or modification. Aviation's strength and safety record is built on the stability of regulations that are consistently and globally applied. However, aviation is on the cusp of dynamic change taking place in the guaranteed availability of spectrum resources. Market forces and other developing technologies continue to exert immense pressure for access to spectrum by "proving" that sharing is technically feasible.

3.7 Aviation is indeed facing a future where it will need to assess its spectrum needs and requirements and may have to justify its requirements to regulatory authorities to ensure long-term access to spectrum resources that are the backbone of the entire industry. Implementation of AIP whether isolated to a few States or widespread in regions of the world will undoubtedly have the potential to completely change how aviation is used to doing business.

#### **4. KEEPING PACE WITH CHANGING TRENDS**

4.1 Recent discussions in the Air Navigation Commission and the Aeronautical Communications Panel (ACP) have highlighted the need for a long-term spectrum strategy and the importance of enhanced participation of CAA experts in assisting ICAO in the development of positions and strategies to ensure protection of aviation spectrum resources (*see Reference 1*).

4.2 The common thread between future implementation of AIP and development of policy positions, strategies and protection of aviation spectrum is the availability of CAA aviation experts worldwide who can support the work of ICAO through their knowledge, expertise and, in particular, their ability to provide influence on the decisions made by their State radio regulators that can impact the aviation sector, whether it is the development and acceptance of general policies and positions, or future considerations towards the development of a framework for implementation of AIP. The work of CAA experts to influence decisions made by radio regulators is vital to the work of ICAO and the aviation sector.

4.3 With the explosive development of multi-media and broadband services along with the deployment and implementation of terrestrial and satellite systems to provide these services, it is apparent a significant shift in the focus of our radio regulators is towards the so called "broadband plan". In the view of many consumers polled through recent market surveys was that this rapidly evolving plan was not needed by consumers during these very difficult economic times.

4.4 Aviation needs to be vigilant to monitor and always be aware of developments of these technically unsupported trends that purport to make a strong “consumer” case and subsequent grab for spectrum resources. Active participation of CAA experts in the work of ICAO is very important to ensure that radio regulators consider the impact AIP would have on the provision of aviation services, and to continually influence the development of State policies and regulatory frameworks such that they are not detrimental to aviation.

## 5. CONCLUSION

5.1 The Assembly is invited to consider the information in this working paper and to endorse in an Assembly recommendation:

- a) that all Contracting States are requested to fully support Resolution A36-25 by providing CAA experts to participate as outlined in the *Resolving Clause 1, paragraphs a) to e)*;
- b) to stress that a rapidly changing market environment will impact future availability of spectrum, specifically requiring the need for enhanced participation of CAA experts to support the work of ICAO to ensure protection of aeronautical spectrum resource;
- c) to further endorse *Resolving Clause 3* of Resolution A36-25 to ensure that the resources necessary to support increased participation by ICAO in international and regional spectrum management activities are made available; and
- d) the need to develop a long-term spectrum strategy.

— END —