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Agenda Item 6: Future direction
6.1: Implementation plans and methodologies

ECONOMIC AND FINANCIAL IMPLICATION OF ASBUs DEPLOYMENT INCLUDING A STATE'S REVIEW ON COST-BENEFIT ANALYSIS

(Presented by Japan)

SUMMARY

This working paper addresses financial challenges in aviation system block upgrades (ASBUs) deployment including cost-benefit analysis (CBA), and proposes actions to facilitate the ATM community in solving the new challenges.

The Fourth Edition of *Global Air Navigation Capacity and Efficiency Plan* (Doc 9750) has been formulated not only to assist States and industry to pursue globally harmonized and interoperable air navigation services (ANS) under the ASBUs framework, but also to foster investment certainty and a sound ground for ANS planning and implementation. In terms of practical ANS deployment, concept of operations making, master plan development, standardization and elementary R&D for new ANS are followed by a phase of implementation planning which entails financial deliberation.

In order to ensure financially sound implementation of ANS in the long-term, the ATM community needs to have common understanding under ICAO financial policy and guidance, which need to be improved or expanded by reflecting the Conference conclusion as well as the latest progress of ANS around the world.

Action: The Conference is invited to consider this working paper and agree to the proposals in paragraph 3.

1. INTRODUCTION

1.1 With its prime purpose of assisting the air traffic management (ATM) community in realizing harmonized and interoperable air navigation services (ANS) under the framework of the aviation system block upgrades (ASBUs) and technology roadmaps, the new GANP is also intended for fostering investment certainty and laying down a sound financially ground for ANS implementation and operation.

1.2 Given that most of the ASBU modules are built upon future or advanced technologies, which a large part of the globe have yet implemented, the future systems in basic can be described as more integrated, more complex, and more interdependent than "legacy systems" (ref. Appendix A to WP/115). This can imply that the future ANS entails large and long-term investment, complicate business models adjusted to individual cases, and hence ATM stakeholders will need to cope with more financial challenges by an approach which takes into account the traits of future ANS.

1.3 In Japan, a long-term vision on ATM renovation in Japan has been formulated as CARATS and is now taking on a shape based on CARATS roadmap, in line with a series of post AN-Conf/11 documents relating to global ATM modernization. In the CARATS deployment, as in other States' counterparts, an intensive analysis and debate have been underway as to cost-to-benefit analysis (CBA) prior to the implementation decision.

1.4 This working paper, accompanied with a brief CBA review in CARATS for reference, introduces financial issues to be shared among ATM community, and proposes actions to facilitate ATM community in solving the new challenges.

2. DISCUSSION

2.1 Economic and financial analyses in CNS/ATM facility implementation

2.1.1 Aviation has greatly contributed to economic prosperity by serving not only national but also regional communities. When considering ASBUs deployment in an effective and sustainable way, ATM stakeholders need to carry out economic and financial analyses, in order to demonstrate to the public, airspace users, financing organization, etc. financial aspects such as "CBA", "business case" and "economic impact analysis" depending on the individual circumstances.

2.1.2 The GANP, Chapter 1 highlights some major financial challenges: 1) definition and implementation of financial and operational mechanism; 2) innovation of complementing traditional funding methodology; 3) mitigation of "last mover advantage"; 4) Assessment of "best-equipped pay less"; 5) unit rate adjustment as per actual air navigation services provided; and 6) regulatory and economic interventions to reinforce negative business case.

2.1.3 Given that the financial aspect of the GANP is to be augmented pre-Assembly by the Sixth Air Transport Conference (AT-Conf/6) in April 2013, AN-Conf/12 is the right time for the ATM community to share common issues and understanding as to financial challenges in ASBUs deployment. This in turn, together with a set of relevant conclusions, will facilitate development or revision of ICAO financial policy materials by which ATM community will practically tackle the challenges (refer to Appendix A for the currently available ICAO materials).

2.1.4 This paper considers economic and financial issues in a general fashion from a State's experience and lessons in ANS implementation planning, but consequential discussion through the whole agenda can warrant the need for development or reinforcement of ICAO financial policy materials above.

2.2 CBA exercise in ASBUs deployment and observation on CARATS CBA outputs

2.2.1 As a part of economic study in CARATS, Civil Aviation Bureau of Japan (JCAB) as ANSP and governmental body, makes it a practice to apply CBA for almost all the ATM enhancement and technology improvement projects to identify the optimum investment options by which maximum net social benefits accrue. CBA exercises have long been applied to large-scale projects so far on the project basis, and the JCAB has found challenging issues which are particular to the future systems as attached (ref. Appendix B).

2.2.2 In light of the above findings, together with its potential applicability to other States' programmes, it would be unlikely viable to lay down more detailed guidance as to CBA and other kinds of economic analyses than those already stipulated in *Air Navigation Economic Manual* (Doc 9161). However, preparing a set of principle and fundamental methodology for these analyses will facilitate not only States but also other stakeholders in having a better understanding on the significance of economic and financial analyses in their implementation planning.

2.3 **Financial implications in ASBUs documents**

2.3.1 Presently, States are supposed to select and carry out appropriate economic and financial analyses for individual cases with appropriate involvement of other ATM stakeholders, by referencing to the basic concept in Doc 9161 (see Chapter 5 for details).

2.3.2 The proposed ASBUs come with a brief guidance on “financial implications” in each AN-Conf/12 WP, on “cost” GANP, and on “CBA” in the latest edition of ASBUs working documents. These will provide for basic information for planning and implementation personnel, but considerate studies need to be taken for each module because the simple explanation is not always the case with different projects in different States, inconsistency between these three documents could cause misunderstanding, and the current Doc 9161 does not prescribe details on the economic and financial analyses.

2.3.3 WP/25 proposes the philosophy for prioritization and allocation of priority for Blocks 0 and 1 modules and request States and Planning and Implementation Regional Groups (PIRGs) to prioritize ASBUs locally in accordance with priority the Conference agreed upon for respective module. Also, WP/19 calls PIRGs for the alignment of Regional Air Navigation Plans with the new GANP by May 2014 deadline. In light of the financial consequence to local economy, investment model and business case, ATM stakeholders need to deliberate on economic and financial implications in their planning work under globally common understanding and guidance as to economic and financial aspects of ASBUs deployment.

2.4 **Financial consideration in SARPs development for ASBUs Modules**

2.4.1 It is a standing practice that States and international organizations are consulted on a proposed SARPs amendment right after ICAO’s preliminary review by means of State letter. The Letter states background, rational, financial impact, etc. of that amendment to assist States’ understanding for that amendment.

2.4.2 Considering that generic statement of financial impact in such State letter cannot always provide universal idea for all the cases on practical term, responses from States and organizations may not provide the correct global picture that the amendment is financially viable. The period before the due may be so insufficient that not a few States may tend to consider just from regulatory compliance perspective. When the response rate is unsatisfactory like less than 50 per cent, this can cloud the globally acceptable level of financial feasibility.

2.4.3 Should it be presumed to take account of financial aspects with satisfactory level of replies under current ICAO framework, ICAO should delve into these institutional subjects to properly inform States and organizations for proper review with financial aspects. This supports the smooth development of globally agreeable ICAO provisions and the avoidance of obliged extension or revision of applicability date of SARPs the States and ICAO experienced.

3. **CONCLUSION**

3.1 There might be a view that economic and financial debate should be properly treated separately on a different table, but economic and financial aspects need to be deliberated in a discreet manner under common understanding and a set of commonly agreed principles from the discussion points above (sections 2.2 and 2.3).

3.2 It is expected that the resultant output on the discussion on economic and financial issues will be dealt with in a coherent manner with the corresponding subjects in the AT-Conf/6.

3.3 Based on the consideration on the issues in section 2, the Conference is invited to agree to the following recommendation:

Recommendation 6/x – Economic and financial consideration in the aviation system block upgrades deployment

That the Conference:

a) request ICAO to consider an effective way to explain the economic and financial implications to States when developing or amending Standards and Recommended Practices for the aviation system block upgrade modules, and national/regional prioritization exercise for RANP amendment so that States can respond properly to ICAO when consulted;

b) request ICAO to study the economic and financial implications the aviation system block upgrades deployment bring, taking into account of the post AN-Conf/11 trend and technical/operational aspects of future aeronautical systems, and develop or reinforce ICAO financial guidance as appropriate; and

c) request ICAO to take the relevant conclusions regarding economic and financial aspects of the aviation system block upgrades for the agenda of AT-Conf/6 to produce coherent solutions aiming at developing sustainable air navigation system.

That the Conference:

a) request States to conduct economic and financial analyses in a closely coordinated manner with relevant ATM stakeholders in view of their diverse position of involvement in the implementation of aeronautical systems.

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APPENDIX A

REFERENCE FOR DISCUSSION

Note.– The below is intended for ease of reference to ICAO financial guidance and relevant working papers raised in Section 2.1 and onward of this paper.

1. Existing ICAO guidelines regarding "air navigation finance and economics"

- *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082)
- *Manual on Air Navigation Services Economics* (Doc 9161)
- *Economics of Satellite-based Air Navigation Services* (Circ 257)
- *Report on the Financial and Related Organizational and Managerial Aspects of Global Navigation Satellite System (GNSS) Provision and Operation* (Doc 9660)
- *ICAO Council provisional policy guidance on the allocation of the incremental costs of more advanced GNSS*
- *Manual on Air Traffic Forecasting* (Doc 8991)

2. Reference AN-Conf WPs

AN-Conf/12-WP/3: Revised Global Air Navigation Plan, based on the discussion in paragraph 4.1 of WP/3:

Action f): The Conference requests ICAO to coordinate the development and agreement on operational and financial policies supporting efficient implementation of global Air Navigation services infrastructure and aircraft equipage.

AN-Conf/12-WP/19: Regional Performance Framework – Planning Methodologies and Tools, based on the discussion in paragraph 2.4 of WP/19:

Action b): The Conference recommends that the planning and implementation regional groups finalize the alignment of regional air navigation plans with the Fourth Edition of the Global Air Navigation Plan by May 2014.

AN-Conf/12-WP/25: Prioritizing the Aviation System Block Upgrade Modules, based on the discussion in paragraph 1.3, 2.10 and 2.11 of WP/25:

The Conference:

Action a): endorse in principle a rationalization of the aviation system block upgrade modules into categories for implementation priority on the basis of the material contained in Appendix A;

Action d): identify modules in Block 1 considered to be essential for implementation at a global level in terms of the minimum path to global interoperability and safety;

Action f): request States and planning and implementation regional groups, in coordination with ICAO, to prioritize implementation of the aviation system block upgrade modules in accordance with the categorization system agreed by the Conference.

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APPENDIX B

OBSERVATION FROM COST-BENEFIT ANALYSIS (CBA) IN CARATS

Note. – For details on Section 2.2 of this working paper, the below outlines the CBA in Japan's CARATS projects and highlights the challenging issues to be shared as reference for discussion on the subject matter.

1. Purpose

Since air navigation systems and services are publicly funded in Japan, Civil Aviation Bureau of Japan (JCAB), as ANSP and governmental body, institutionalize CBA to be applied for almost all the ATM enhancement and technology improvement projects in order to identify the investment option that best suits to economic goal of maximizing net social benefits.

2. Basic principle and methodologies

The analysis, as a whole, is in line with Chapter 5, Doc 9161 and its details are on the Japanese regulations, directions and CBA manual which are applicable to public infrastructure work undertaken by Government of Japan. The manuals have gone through a series of advisory committees and taskforces on CBA over more than a decade. The CBA manuals lay down CBA methodologies across domains and set forth essential parameters for CBA equations, period assessed, demand forecast for air traffic, benefit items, cost items including not only quantifiable items but also unquantifiable ones.

3. Challenging issues recognized

< methodological aspect >

- Interdependency among multi-CNS systems, their continuous evolving nature and diversified service-life puzzle analysts to zero in on the object system and period CBA applies to.

- Space-based systems such as SBAS and GBAS need a long-term perspective to have benefits outweigh costs because of its relatively long project life and substantial investment on satellite systems.

- Unlike well-established air traffic and passenger forecasting, projection or assumption of equipage ratio is difficult.

- Among other things, projects in the domain of information management, meteorological service upgrades and advanced future communication systems have turned out to be difficult in specifying scope and representing tangible benefits in figures.

< institutional aspect >

- How can region or PIRG best employ CBA in regional decision-making process in recognition of diversity of economic analysis employed in States and industry partners?

- How can a State properly accommodate foreign carriers and interdependent projects of its counterparts in their own national CBA equation?

- Even in a single project, each entity of the ATM stakeholders involved generally has different stake under different management such as aviation authority, ANSP, airlines, municipalities, passengers and freight so forth. Hence type of applicable economic analysis and prerequisites naturally vary by entity and it may take an onerous long process to reach a consensus among the stakeholders on CBA methodology and outputs.

- In the case where the projects has weight on aeronautical safety and sustainment of local/remote life, different approach needs to be taken on case-by-case basis under certain criteria, but with a transparent and unified philosophy.

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