Multi-Disciplinary Working Group on the Economic Challenges Linked to the Implementation of the Aviation System Block Upgrade
(MDWG-ASBU)
Working Group 4

Introduction:

The Multi-Disciplinary Working Group (MDWG) on the Economic Challenges Linked to the Implementation of the Aviation System Block Upgrade (ASBU) was struck to assist the Secretariat in meeting Recommendation 2.7/1 (b) of the *Sixth Worldwide Air Transport Conference* (ATConf/6), which is set out at paragraph 5.2 of the Report of the first meeting of the MDWG, held in February 2013. At the February 2013 meeting, four working groups were struck to perform the necessary analysis and assessment. The taskings can be found at paragraph 17.2.2 of the Report.

Working Group Four was asked to:
1) consider how the findings of MDWG-ASBUs are impacting ICAO policies;

2) ascertain the effectiveness of current ICAO policies; and

3) assess the need of new policies.

Following the completion of the work for Working Groups One, Two, and Three, Working Group Four has reviewed their reports and, below, sets out its recommendations for their integration with existing ICAO Policies and Guidance Material.

Following the conclusion of MDWG-ASBUs work, the final Report and accompanying material should be provided to the Airport Economics Panel-Air Navigation Services Economics Panel (AEP-ANSEP) for review and determination as to how the conclusions may be included, or not, in existing ICAO policies and guidance material.

Working Group Outcomes:

<u>Use of Incentives to Encourage Implementation of Aviation System Block Upgrades:</u>

This paper discusses the possibility of using financial or operational incentives, or a combination of both, to encourage timely implementation. The paper outlines considerations for using incentives, including best practices as well as a substantial selection of examples.

<u>Methodologies for undertaking Cost Benefit Analyses:</u>

This paper provides descriptions of Cost Benefit Analyses, Business Cases, Economic Impact Assessments, and Cost Effectiveness Analyses, means of undertaking each, as well as circumstances in which they are most effective or appropriate. Extensive examples are provided.

Financing ASBU Implementation:

This paper identifies various options that could be used to finance and fund ASBU implementation, discusses advantages and disadvantages of each, as well as considerations and circumstances that should be considered when choosing one or more approaches.

Current ICAO Policies and Guidance:

The primary ICAO policy relevant to the work of the MDWG are the Policies on *Charges for Airports and Air Navigation Services* (Doc 9082). This policy sets out the basic parameters for charges for the use of airports and air navigation services by international civil aviation. In addition to core criteria for any charges, *i.e.* that they be transparent, cost-related, non-discriminatory and follow consultation with users, there are specific provisions for dealing with "differential" or "modulated" charging schemes. In the current context those categories include incentives.

The criteria for incentives are relatively straight forward: an assessment as to the pros and cons of using such charging schemes should be undertaken; the purpose, creation, and criteria for the incentives should be clear; incentives should not result in additional costs being allocated to other users; and, in the case of incentives used to attract new traffic, they should be time limited. These policies provide sufficient coverage for any financial incentives that might be considered in the ASBU process.

It may be considered that, as for incentives used to attract new traffic, these incentives should be time-limited; however, as the intention is to encourage implementation/adoption of new technology, it is not certain that a defined time-limit is necessary or appropriate. The use of incentives to encourage adoption of new technologies should be a continuing process, and should eventually become the 'new normal'. That is, that any financial incentives should, in keeping with Doc 9082 be cost based, etc.; as the new technology becomes standard, the incentives should eventually cease to be incentives and should, therefore, simply reflect an ANSP's cost recovery practices. Even if the incentives remain incentives for some of an ANSP's users for a period of many years because those users have not implemented the necessary technology, it does not logically follow that the incentives should be eliminated. The purpose of such incentives is to encourage implementation, even if it takes several years, that purpose remains valid, and there is no benefit to be gained from eliminating them.

In addition to Doc 9082, ICAO has produced guidance material for ANSPs. The *Manual on Air Navigation Services Economics* (Doc 9161), provides guidance on the implementation of Doc 9082 and related matters. This document contains material regarding the use of incentives by ANSPs, beginning at paragraph 5.174. This material is quoted almost verbatim in the paper prepared by Working Group One, and it provides a solid basis for States and ANSPs to assess the appropriateness of financial incentives. What is not provided is any material on the use of operational incentives; the absence is understandable given the focus on economics but some

general statements, perhaps with reference to other material, might be useful. This is particularly the case as one of the goals of such incentives is to increase efficiency, which is something Doc 9161 addresses.

It must be determined whether the proposed policy and guidance material should be included in existing documents, such as 9082, or 9161, or in a new document. Although operational incentives are, on first glance, obviously beyond the normal scope of these documents, which concern economic, rather than operational, matters, it could also be suggested that, as the primary focus is effective and efficient implementation, there may be a place for them in the 'economic' policies and guidance. An appropriate vehicle for guidance related to operational incentives, with appropriate reference, or cross reference, to financial incentives might be the GANP. However, that is a question that would be best determined by the whole of the MDWG-ASBU.

The papers prepared by Working Groups Two and Three, in particular, can serve to enhance existing material in Doc 9161. While there is existing material on both financing of ANS infrastructure and the preparation of cost benefit analyses, the work of the two groups suggests that some additional material might appropriately be included in Doc 9161. In both cases the inclusions would be of a general nature, rather than being explicitly tied to the ASBU process. This is because Doc 9161 is for general application, and any material included must be capable of being used in any relevant situation. However, the nature of the material prepared by Groups Two and Three is such that it can be applied more broadly and is not limited to ASBU implementation. The proposed text below is substantially shorter than that provided in the Reports, however, space in Doc 9161 is at a premium, and the proposed text is also predicated on the assumption that individuals will be able to access the more expansive Reports should they wish to do so. Alternately, the Reports prepared by Working Groups Two and Three could be submitted in their entirety to the AEP-ANSEP as working papers and the Economics Panels be tasked with using them as a basis for new guidance material, either in Doc 9161 or as standalone guidance material.

Given that there is significant overlap between the material in Doc 9161, and the approach outlined in both Reports has broader applicability, it would also be appropriate to include the same material, with changes as appropriate, in the Airport Economics Manual (Doc 9562).

Following discussions and decisions at MDWG-ASBU/2 material developed can be provided to the AEP-ANSEP for the consideration of the Panels.

Recommendations:

1. It is recommended that, once the MDWG-ASBU has reached its conclusions, they be transmitted to the AEP-ANSEP for the consideration of the Panels.

2. It is recommended that no changes be made to the existing ICAO *Policies on Charges for Airports and Air Navigation Services* (Doc 9082). The existing Policies provide ample cover for financial incentives of the sort contemplated by the MDWG, and there is no need to introduce new complexities into the existing framework.

3. It is recommended that key elements of the reports of the three Working Groups be included in the existing ICAO *Manual on Air Navigation Services Economics* (Doc 9161), and, with appropriate modification, in the *Airport Economics Manual* (Doc 9562) or as stand-alone guidance material. Any text added to the Guidance Material should be general in nature and, while useful in the context of the ASBU, should not be specifically geared to that process. Possible text is included at Annex A, or, the Reports prepared by the MDWG-ASBU Working Groups could be provided as working papers for the next AEP-ANSEP meeting for the consideration of the joint panel which will make such recommendations as it sees fit.

4. It is recommended that ICAO develop new policy and guidance material, in the GANP, or elsewhere is determined to be appropriate, for operational incentives which draws on the model found in Doc 9082 pertaining to financial incentives. The new material should also, at least, make reference to material on economic incentives in Docs 9082 and 9161. In particular, the new material should identify the need to ensure that:

   such incentives do not inadvertently encourage unsafe behaviour;
   they do not discriminate between domestic and foreign users;
   they are clear and transparent with obvious criteria for application; and,
   they are directly linked to the outcome to be achieved.

   Draft text is included at Annex B.

Annex A

Amendments to the Manual on Air Navigation Services Economics (Doc 9161)

To be included as a table following paragraph 6.60 of Doc 9161

Method of Financing	Types of Expenditures Financed
1. Loan or Borrowing Based	For meeting short-term (1 to 5 years) Working Capital requirements or for short term bridging loans. Most ANSPs use this method of financing. A more commercial version is sale and lease back of large assets often used by ANSPs and Airlines.
2. Institutional Lending or subsidized Loans	To finance Medium-term (8 to 10 years) Capital projects. The Projects are clearly documented with detailed costs and where meaningful with Cost Benefit analyses and showing how the financing costs would be refunded over the period of the loan. Typical use is for ATM installations like Radar or purchase of aircraft. It could also be in the form of securitisation of part of future Revenue streams for up front Project funds.
3. Grants or Non-Repayable Loans	Medium to large Projects to meet broader economic or social objectives of National Governments and/or Regional organizations. This type of financing could be for modernisation or upgrading of small or medium airports. Increasing Security arrangements or for undertaking multi-state projects which would benefit the States undertaking the Project.
4. Equity Based	To bring in private sector capital and to broaden stakeholder participation. Although States are responsible for the provision of Safe ATM services often the high costs of such services prompt States to create Corporatised Service Providers, which could raise funds more easily through issue of equity rather

	than through government taxes. This type of financing introduces a form of sharing of Risks and Rewards. Often the Equity issued does not represent 100% of the value as Governments wants to retain some control over the future strategy of the organisations United Kingdom NATS and DFS in Germany is following this route. IPOs can be a risky investment as there is often little historical experience upon which to be able to analyse and price the issue
5. Private Public Initiatives	Large Projects with clear paybacks in terms of making profits directly or indirectly through reduction of costs payable in the future by the parties concerned. The type of Projects would include building of a New Airport or extension of a large airport or a Complete new ATM facility.

To be included as a new Appendix for Doc 9161

Cost-Benefit Analysis and Related Assessments

Assessments

There are four common approaches used to determine whether a given investment or process would be beneficial; development of a Business Case, Cost Benefit Analysis (CBA)/Benefit Cost Analysis (BCA), Economic Impact Assessment (EIA), and Cost-Effectiveness Analysis (CEA). Depending on circumstances, one or more may be appropriate.

Business Case

A business case sets out the context, identifies the issue(s) to be addressed and provides a detailed description of the proposal selected as well as the rationale for its selection from among other options. Factors to be assessed in developing a business case include:

- Financial analysis – including cost projections, cash-flows, capital and financing assessment
- Strategic drivers – including analysis of market, related products and services, political and social factors and environment
- Organizational performance factors – including service improvement, efficiency, workload and productivity, contingency planning, safety and security improvement, and compliance with standards and regulations
- Cost benefit analysis – addressed independently below

- Risk assessment – including potential risks accompanying the proposed approach and potential mitigation actions
- Stakeholder impact – impact on stakeholder groups and users of air navigation services, including divergence of interest between groups

Cost Benefit Analysis

A cost benefit analysis (CBA) or benefit cost analysis (BCA) seeks to identify the investment option best maximizing net societal benefits. A CBA is the most appropriate approach where a project will be publically funded, as it will assess both public and private costs and benefits.

Costs and benefits should be objectively identified and quantified and determine when they will accrue. A base case, often "*status quo*" or "do nothing", must be identified to enable proper assessment. A CBA should:

- Identify all costs and benefits
- Quantify costs and benefits to calculate economic value
- Classify costs and benefits by order of importance
- Make cash flow projections
- Determine the critical factors for success; and
- Select the best option

Economic Impact Assessment

An Economic Impact Assessment seeks to determine the broader, or cumulative economic effect of an investment project on the economy as a whole. It will include not only direct effects, but also indirect and induced economic activity, including:

- Employment;
- Personal income;
- Business revenues;
- Tax revenues; and,
- Capital investment

Cost Effectiveness Analysis

Cost effectiveness Analysis (CEA) seeks to determine how effective alternate approaches would be in achieving a stated objective. It can be used where the benefits are difficult, or impossible to quantify, while the potential costs can be readily determined.

<u>Considerations and Application</u>

Every major investment decision taken by a State, an airport or a provider of air navigation

services should be supported by analyses to demonstrate to providers, users and, as appropriate, the wider community, the costs and benefits accruing from investment in infrastructure. CBAs and business cases should be tailored to be proportionate to the size of planned investment, an appropriate use of resource and should add value to the decision making process. Consultation with users should be a part of this process.

Differing stages in the development or implementation of infrastructure/technology will warrant different assessments. For example, a simplified example of a maturity lifecycle model for the aviation system block upgrade (ASBU) programme would include three lifecycle stages: research and development (R&D) identification of needs and concept definition; R&D validation and feasibility; and, implementation and deployment.

Following the identification of needs and concept definition R&D phase, a State or organisation would seek a very high level assessment of whether there are potential benefits to be exploited in a particular area and might consider a high level strategic CBA a proportionate and acceptable technique at that stage of development. Evaluation at this stage would look to help answer the question – "Is it worth our investment to explore possible benefits in this area?"

At the R&D validation and feasibility stage, a more detailed CBA assessment would be warranted to allow comprehensive comparison of known options for achieving the desired objectives. Evaluation at this stage would look to help answer the question – "Should we continue to invest in this area, and if so, which of the possible options should we commit to?"

The final stage would be to determine whether to actually invest in deployment and operations. At this stage a full business case would be required all factors relating to the financing of the investment, the impact on performance and operations, risks, safety and security and stakeholder impacts would need to be considered before deploying. It is useful to refer to the planning process described in the Global Air Navigation Plan, in particular to assess needs and the different available solutions that can best fulfill them. Evaluation at this stage would look to help answer the question –
"What are all the possible implications of proceeding to deployment with this investment, and given these should we proceed?"

<u>Elements of a Cost Benefit Analysis or Business Case</u>

A CBA or Business Case should include:

- Define the Objective and Scope – what is the objective and desired outcome, and what are the parameters that will be used, and who will be affected;
- Specify Assumptions – any assumptions should be explicitly stated and their basis justified;
- Define the base case and identify alternatives – what is the difference from the *status quo*, and what are other possible approaches to achieving the same objective;
- Identify the Benefits and Costs – all benefits and costs for the base case and each possible alternative must be clearly identified, quantified, and assessed. It will not always be

possible to quantify in monetary terms, but intangibles must also be clearly identified. These steps should be taken in light of the stated objective;

- Compare Costs and Benefits – the various costs and benefits for each possible approach will need to be made comparable and appropriate comparisons undertaken to determine the most appropriate approach. Net Present Value, Benefit to Cost Ratio, Internal Rate of Return, and payback period are common approaches to achieve this desired evaluation and comparison;
- Conduct sensitivity analysis – this process determines how sensitive the proposed outcome is to chases in uncertain factors and will assist in identifying the level of uncertainty or risk in a given proposal.
- Distributional Aspects – the beneficiaries of a project are not necessarily those who bear most of the costs, the broader impact of the costs and benefits should be assessed to ensure that those who bear the costs do not do so without receiving appropriate benefits;
- Make Recommendations – following all appropriate analysis, the CBA or business case should make a clear, evidence based recommendation.

Annex B
Proposed text for Inclusion in an ICAO Policy on Operational Incentives

Incentives for the adoption of new technologies:

When developing and implementing new technology for the purpose of increasing the efficiency and effectiveness of air navigation services, it may be beneficial to provide incentives to users and air navigation service providers to encourage prompt and widespread adoption. Use of incentives will not guarantee successful implementation, but can serve to encourage adoption, particularly by limiting the advantages that can accrue to 'last users' who decline to implement new technologies, while seeking to attain the benefit of them. Such incentives should not, however, be structured in such a way as to have the effect of imposing negative outcomes on users who are not able to rapidly adopt the new methods.

Incentives can be either operational or financial. Financial incentives should comply with the terms of ICAO Doc 9082 *Policies on Charges for Airports and Air Navigation Services*. In particular, paragraph 6(v) of the Policies on Charges for Air Navigation Services, states that differentiated charges (which include incentives) should be assessed and the pros and cons of providing such incentives be weighted (see segment below on Cost-Benefit Analysis), and that States should ensure that if incentives are introduced, the purpose, creation and criteria for the differential charges are transparent. Further, any costs arising from the use of incentives should not be allocated to users not benefiting from them.

The existing policies and guidance material relating to charges provides a solid framework on which to develop policies regarding the use of operational incentives. Many of the broad criteria could equally apply to operational incentives.

In particular, any operational incentive should ensure that:

The goal or objective behind the incentive should be transparent and clearly stated;

Incentives should be readily understandable, processes for application or qualification should be clear, and they should be available to any user who meets the relevant criteria;

Incentives should not be structured in such a way as to discourage the use of facilities and services necessary for safety;

Incentives should not be structured in such a way to discriminate between foreign users and those having the nationality of the State or States responsible for providing the air navigation services and engaged in similar international operations, or between two or more foreign users.

Incentives should be subject to rigorous cost-benefit analysis prior to introduction; and,

Incentives should be the subject of consultation with users and other affected parties (e.g. regional ANSPs) prior to introduction.

In determining whether to apply operational incentives, an ANSP should assess and be able to readily describe and explain:

- The nature of the incentive – whether operational, financial or both;
- The reason for implementing the incentive – including the intended impact on ATM performance, whether capacity, efficiency, safety, environmental, or other, and how it will be monitored and assessed;
- To whom the incentive would apply, who the beneficiaries would be (if different), and what requirements are for receipt of the incentive – including the users affected/eligible whether by aircraft type/equipage or by nature of operations, necessary certifications, and any other relevant factor;
- The equipment necessary for the practical application of the incentive, both for the ANSP and for aircraft operators;
- To whom the incentive would not apply and the impact on operations, costs, or otherwise on those parties;
- The geographic area where the incentive applies;
- The time period (if any) for which the incentive will apply, and whether the time is a calendar date, or a desired level of implementation/adoption;
- The considerations including, as applicable, development of business cases or cost benefit analysis undertaken, consultations held, regulatory processes, broader ATM strategy, what were examined and assessed in the development of the incentive program.