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Manual on Air Traffic Forecasting

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and published under his authority

Third Edition — 2006

International Civil Aviation Organization

FOREWORD

1. The work of the Organization in the field of air traffic forecasting is governed by Appendix C of Assembly Resolution A35-18 *(Consolidated statement of continuing ICAO policies in the air transport field)*:

Appendix C — Forecasting and Economic Planning

Whereas Contracting States require global and regional forecasts of future civil aviation developments for various purposes;

Whereas the Council, in carrying out its continuing functions in the economic field, must foresee future developments likely to require action by the Organization and must initiate such action in good time; and

Whereas the Organization requires specific forecasts and economic support for airports and air navigation systems planning and environmental planning purposes;

The Assembly:

1. *Requests* the Council to prepare and maintain, as necessary, long-term and medium-term forecasts of future trends and developments in civil aviation of both a general and a specific kind, including, where possible, regional as well as global data, and to make these available to Contracting States;

2. *Requests* the Council to develop methodologies and procedures for the preparation of forecasts, the analysis of cost-benefit or cost-effectiveness, and the development of business cases, to meet the needs of the regional air navigation planning groups and, as required, other systems or environmental planning bodies of the Organization; and

3. *Requests* the Council to make arrangements to collect and develop material on current forecasting methods both for the purposes described in clauses 1 and 2 and for dissemination to Contracting States from time to time as guidance in their own forecasting and economic planning.

2. This manual represents a partial fulfilment of the requirement set out in the third resolving clause "to collect and develop material on current forecasting methods ... for dissemination to Contracting States from time to time as guidance in their own forecasting and economic planning". The first edition of this manual was published in 1972. The second edition, published in 1985, took into account additional material received by ICAO and experience gained during the intervening period. This third edition takes into account new material developed by ICAO and additional experience gained since 1985.

3. This manual is addressed to civil aviation administration personnel, airline planners, planners of airports and air navigation systems and others actively engaged in practical forecasting work. It provides a survey of techniques currently used for air traffic forecasting, and practical guidance on the application of these techniques. The advantages and disadvantages of the techniques as well as the criteria for selection of a particular technique for the forecast concerned are discussed. These techniques can vary considerably in their usefulness and sophistication.

4. The manual is divided into three parts. Part I presents the techniques that are available for air traffic forecasting purposes. These are classified into three broad categories: quantitative, qualitative and

decision analysis. Within quantitative forecasting methods, time-series analysis using both trend projection and decomposition methods are presented. This is followed by a presentation of causal methods for traffic forecasting based on the formulation of cause and effect relationships between air traffic demand and the underlying causal factors. Econometric analysis methods, widely recognized for the development of air traffic forecasts, are described in detail, along with procedures to interpret and understand summary statistics and the pros and cons of estimation procedures. This is followed by a presentation of other causal methods. Part I also presents other methods of forecasting under "qualitative forecasting methods" and "decision analysis". A discussion of various forecasting time horizons and forecasting accuracy is included. This is followed by a set of illustrative examples from various regions of the world including an illustration of the development of a longer term (fifty-year) forecast.

5. Part II of this manual presents methods and procedures for forecasting for aviation planning, including forecasting for air navigation planning, airline planning and airport planning purposes. The methods developed by ICAO and its regional traffic forecasting groups (TFGs), including those required for the progressive implementation of the components of the communications, navigation, surveillance/air traffic management (CNS/ATM) systems, are included in this section.

6. Part III of this manual is devoted to case studies and methodologies developed by selected Contracting States and other organizations to develop forecasts for the requirements of civil aviation, including aviation forecasting methods used by the European Organisation for the Safety of Air Navigation (EUROCONTROL), Canada, India and Tunisia. This is followed by a presentation of methodologies used in forecasting for airports including methods applied by airports in India and Newark Airport in the United States.

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