

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

Agenda Item 3: Air traffic management (ATM) performance targets for safety, efficiency and regularity and the role of required total system performance (RTSP) in this respect

3.1 Performance targets for ATM

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3.2 The concept of RTSP

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THE CONCEPT AND PERFORMANCE TARGETS FOR RTSP IN AIR TRAFFIC MANAGEMENT

(Presented by IATA)

SUMMARY

¹ Arabic, French and Spanish versions provided by IATA.

In the context of RTSP, International Air Transport Association (IATA) Member airlines support the concept of required ATM system performance (RASP) based on the Air Traffic Management (ATM) community expectations. However, the airline community expectations go further.

Safety is paramount but efficiency and regularity are crucial to the development of a sustainable, efficient and cost-effective air transport system.

The efficiency of an ATM service provider in delivering a service, including the equipment and staffing, has a profound effect on the cost of that service to the airspace user.

Many elements relating to efficiency and regularity cannot be established mathematically in the manner that those relating to CNS are being developed for RTSP (i.e. RNP, RCP, RSP). ATM is not a technical standard per se but rather the human application of service provision. ATM does not conform to a universal mathematical formula.

ATM is measurable and should be evaluated through observation, benchmarking and comparison with best practices. This evaluation should be achieved through an audit process.

1. INTRODUCTION

1.1 Required total system performance (RTSP) is related to the “measurement of safety, efficiency and regularity of the emerging and future global ATM system” (ICAO State letter ST 12/1-02/58 refers). The word “total” in RTSP encompasses communication, navigation, surveillance and air traffic management (CNS/ATM).

1.2 The development of performance targets for the CNS elements, from the perspective of safety (such as accuracy, availability and integrity) has been underway for some time. With respect to ATM, only safety performance has been adequately addressed globally², through safety case analysis and monitoring programmes.

1.3 Achievements to date can be summarised as follows:

1.3.1 **Communications (C):** Technical performance requirements for communications have existed for several decades in the form of ICAO Standards and Recommended Practices (SARPs) along with State and industry requirements, e.g. ITU, RTCA, AEEC, ISO. Since the emergence of CNS/ATM at the Tenth Air Navigation Conference, the notion of required communication performance (RCP) has been

² IATA recognises the valuable work done in Europe by the Performance Review Commission, PERFORMANCE REVIEW REPORT, An assessment of Air Traffic Management in Europe during the calendar year 2002, PRR 6.

developed both globally and regionally. RCP exists for controller pilot data link communications (CPDLC) and Automatic Dependent Surveillance (ADS). The focus has been on the technical elements. However, attention must be also paid to more elusive elements related to human factors, such as the use of English in air traffic control (ATC) voice communications, which ICAO has addressed recently in a proposed amendment to Annex 1³.

1.3.2 **Navigation (N)** is a well-defined, measured and monitored element. Required navigation performance (RNP) requires measurement and monitoring of navigation equipment parameters including accuracy, availability and integrity for each RNP type.

1.3.3 **Surveillance (S)** is subject to development of required surveillance performance (RSP) criteria, e.g. for ADS-B.

1.4 **Air traffic management (ATM)** is best assessed from a target performance perspective by examining the core elements of safety, efficiency and regularity. Since safety in ATM is a mature element, subject to safety case analysis, collision risk models, monitoring programmes and safety management systems, the discussion of this paper will focus on the efficiency and regularity of ATM.

1.5 **Required ATM system performance (RASP)** defined by the Air Traffic Management Operational Concept Panel (ATMCP) is associated with **expectations** as they apply to the ATM community as a whole. The ATMCP has identified a number of expectations *inter alia* safety, capacity, access and equity, efficiency, flexibility and predictability. These expectations correspond to the external perception of ATM by the travelling public and the ATM community. However, all members of the ATM community do not have the same expectations and it is important that the user perspective is given greater emphasis. For example:

1.5.1 Air traffic control focuses on separation of aircraft (safety and regularity) but not always on the management of air traffic efficiency.

1.5.2 In some geographical areas inefficient air routes or arrival/departure procedures force airlines to carry excessive fuel and consequently, on many occasions, limit the amount of payload (passengers and cargo) that can be carried. ATC will often attempt to rectify the situation through more elaborate services such as radar vectoring. Although ATC providers may perceive this as an efficient service, in reality it is a means of compensating for systemic inefficiency and cannot be factored into the flight profile at the flight planning/payload calculation stage.

³ Annex 1 to the Convention on International Rules Concerning Licences, Chapter 1, Definitions and General Rules Concerning Licences, Appendix, Requirements for Proficiency in Languages used for Radiotelephony Communications.

1.6 The ATM community must recognize that the expectations of the airspace user are paramount. These expectations based on operational and infrastructure system performance requirements. They should be:

- 1) agreed through consultation with the airspace users;
- 2) driven by the need to improve efficiency, capacity and cost effectiveness;
- 3) supported by a cost/benefit analysis; and
- 4) if applicable, fully coordinated with adjacent States by regional agreement.

2. SAFETY

2.1 Safety is and will always be paramount to efficiency and regularity. Safety as a quantifiable number does not necessarily carry a fixed required value in all airspace cases. Underlying terrain and traffic density will determine the measures that mandate acceptable safety for air traffic services. Airspace may require the highest standard of communications, surveillance and navigation in order to allow monitoring, detection and intervention by ATC, or may require only third party communication and procedural surveillance.

2.2 In determining system performance, safety must always carry a greater weight. Achievement of high values of efficiency and regularity but with low safety values is not an acceptable system.

3. EFFICIENCY

3.1 Efficiency of ATM needs to be addressed from two perspectives, the efficiency of the:

- 1) ATM service provider; and
- 2) service itself.

3.2 In the context of ATM system performance measurement, efficiency of the service would be an appropriate element to benchmark. However, from a total system perspective, the efficiency of the ATM service provider in delivering service has a profound effect on the cost of that service to the airspace user. For instance, radar control in remote airspace might be an unnecessarily expensive form of air traffic control.

3.3 The measures of “efficiency” should include those individual elements that contribute to the efficient operation of the airplane from gate to gate, such as:

- 1) on time departure;
- 2) ground movement (taxiing);
- 3) airport departure rate;
- 4) restrictions that may prevent on-time departure and efficient climb out;
- 5) route of flight based on operational requirements, which would mainly be based on upper wind;
- 6) ability to change route of flight en route (UPRs);
- 7) ability to assign an efficient cruising altitude;
- 8) ability to allow descent for approach without delay;
- 9) ability to assign an efficient unrestricted descent profile (such as control idle descents);
- 10) airport arrival rate;
- 11) availability of high-speed taxiways to minimise runway occupancy;
- 12) ground movement to arrival gate (taxiing);
- 13) charging policy.

4. **REGULARITY**

4.1 Regularity is the provision of a system and service to an established routine or schedule, based on normal or accepted rules and standards. It is also conformance to SARPs, consistent application of best practices and availability of services when required. Regularity is essential for a seamless global airspace and harmonized worldwide ATM. A non-exhaustive list of “regularity” elements includes:

- 1) Aeronautical information services, which include timeliness of information, use of Annex 15 format for AIPs, adherence to aeronautical information regulation and control (AIRAC) dates and AIRAC cycles to allow for data preparation, training, simulation, etc. It also includes data accuracy and use of common data format, e.g. WGS-84;

- 2) meteorological services, including reliability of weather information in accordance with ICAO provisions;
- 3) availability of advertised services, including service records of radar, nav aids, radios, communication lines, rescue and fire fighting services, etc.;
- 4) arrival/departure procedures. Many times instrument procedures are established but intervention by ATC will not allow the procedure to be flown. Procedures should be developed in a way that encourage predictable and consistent application and use, following a consistent design logic and standard, understanding of acceptable aircraft performances and pilot contingencies and the ability to be coded to flight management system (FMS) logic;
- 5) Search and rescue (SAR) and accident investigation; and
- 6) adherence to ICAO SARPs. One of the most important aspects of regularity is the consistent application of the ICAO SARPs.

5. MEASUREMENT OF SAFETY, EFFICIENCY AND REGULARITY

5.1 The technical elements of communications, navigation and surveillance have parameters that can be easily quantified. Air traffic management is not a technical standard but rather the human application of services based on the cumulative effects of laws, procedures, culture, workforce management, available tools, training and technique. ATM cannot be measured by a universal formula. Assessment can only be achieved through a process based on an understanding of global best practices and benchmarks that are unique to a State, CAA, facility, airspace, advertised service and the airspace user.

6. ACTION BY THE CONFERENCE

6.1 The conference is invited to:

- a) request that ICAO include the efficiency and regularity elements presented by IATA in this paper when further developing RASP and RTSP;
- b) note that many elements relating to efficiency and regularity cannot be established mathematically in the manner that those relating to CNS are being developed for RTSP (i.e. RNP, RCP, RSP);

- c) note that when evaluating efficiency of an air traffic services (ATS) provider, the costs associated with providing the service and the resulting benefit to the airspace user must be considered;
- d) note that safety is paramount but efficiency and regularity are crucial to the development of a sustainable, efficient and cost effective air transport system; and
- e) note that ATM is measurable and should be evaluated through observation, benchmarking and comparison with best practices. This evaluation should be achieved through an audit process.

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