

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

Agenda Item 4: Capacity-enhancement measures

4.2 Regional measures

:

AIR-GROUND DATA LINK IMPLEMENTATION IN EUROPE: THE LINK 2000+ PROGRAMME

(Presented by the European Organisation for the Safety of Air Navigation —
EUROCONTROL, on behalf of its Member States and those of ECAC¹)

INFORMATION PAPER

SUMMARY

With this paper EUROCONTROL informs the Conference about its data link implementation plan for Europe, its objectives, its benefits, the technology used and the possibility of a mandate for data link equipage of aircraft.

* English, French, Russian and Spanish versions provided by Eurocontrol.

¹ The ECAC Member States are: **Albania**, Armenia, **Austria**, Azerbaijan, **Belgium**, Bosnia and Herzegovina, **Bulgaria**, **Croatia**, **Cyprus**, **the Czech Republic**, **Denmark**, Estonia, **Finland**, **France**, **Germany**, **Greece**, **Hungary**, Iceland, **Ireland**, **Italy**, Latvia, Lithuania, **Luxembourg**, **Malta**, **Moldova**, **Monaco**, **the Netherlands**, **Norway**, Poland, **Portugal**, **Romania**, Serbia and Montenegro, **the Slovak Republic**, **Slovenia**, **Spain**, **Sweden**, **Switzerland**, **The former Yugoslav Republic of Macedonia**, **Turkey**, Ukraine and **the United Kingdom**).

The 31 Member States of EUROCONTROL appear in **bold**.

1. INTRODUCTION

1.1 In the nineties EUROCONTROL started operational trials of air-ground data link. Data link was seen as a potential solution for the voice channel occupancy problem that became more and more critical in the busiest air traffic control sectors in Europe. The trials were successful. Air-ground data link was welcomed by pilots and controllers who could experience the operational benefits of it.

1.2 Based on this experience and with the full support of the stakeholders, EUROCONTROL decided to launch an air ground data link implementation programme for Europe: the LINK 2000+ Programme.

1.3 The purpose of this paper is to inform the conference of the objectives of the programme, its time scales, the modalities of the data link implementation in Europe, and to encourage other regions to consider the European experience when planning their own implementation.

2. DATA LINK IMPLEMENTATION IN EUROPE

2.1 Objectives

2.1.1 The objective of the LINK 2000+ Programme is to implement air-ground data link services for air traffic control (ATC) in the core area of Europe (Belgium, the Netherlands, Luxembourg, Germany, Austria, Switzerland, Italy, France, Spain and Portugal), based on the aeronautical telecommunication network (ATN) and VHF digital link Mode 2 (VDL Mode 2).

2.2 Data link services

2.2.1 The programme concentrates on the implementation of controller-pilot data link communications for en-route ATC:

- a) ATC communication management (ACM) used to transfer aircraft silently between sectors or centres;
- b) ATC clearances (ACL) used to request and issue ATC clearances; and
- c) ATC microphone check (AMC), used to alert pilots about a blocked voice frequency).

2.2.2 In addition it provides a migration path to ATN/VDL Mode 2 for services already existing over ACARS²:

- a) departure clearance (DCL) used to issue departure clearances to aircraft before departure;

² ACARS — Aircraft Communications, Addressing and Reporting System

- b) digital ATIS (D-ATIS) used to provide an aerodrome terminal information service via data link; and
- c) oceanic clearance (OCM) used to provide oceanic clearances to aircraft.

2.3 Benefits of ATC data link

2.3.1 The benefits of controller-pilot data link communications include reduced controller and aircrew workload and reduced voice congestion. These benefits provide an opportunity for air traffic management (ATM) capacity increases if a sufficient number of aircraft is data link equipped. The availability of a second communication channel, reduced communication errors, and reduced pilot and controller fatigue will contribute to higher safety levels. Using controller-pilot data link communications for routine messages will make the voice channel available for urgent messages. This will also contribute to higher safety levels.

2.3.2 These benefits have been derived from studies and simulations in several ICAO regions and are well documented and widely accepted. They have been confirmed by the operational use of data link in oceanic airspace, and more recently in domestic airspace (Miami and Maastricht).

2.4 Communication technology considerations

2.4.1 The implementation programme is based on the ICAO defined aeronautical communications network (ATN) using the ICAO defined VHF digital link Mode 2 as a sub-network. In doing so the programme acknowledges the need for a global harmonisation of data link services and technology. Moreover, the selected technology combination has been successfully used by EUROCONTROL in operational trials and is currently also used by the FAA in its CPDLC Programme at the Miami Centre.

2.4.2 Recognizing the fact that a number of long haul aircraft are FANS 1/A equipped, a study has been made of the possibility to accommodate these aircraft in an ATN/VDL Mode 2 environment. It has found that in order to accomplish this safely a number of issues need to be addressed and a number of problems need to be mitigated (e.g. the use of the correct ICAO phraseology in the messages; the satisfaction of the performance requirements, etc.)

2.5 Ground deployment

2.5.1 EUROCONTROL has secured the commitment of the air navigation service providers of Austria, Belgium, France, Germany, Italy, the Netherlands, Portugal and Spain to provide data link services in the upper airspace by 2007.

2.5.2 The EUROCONTROL Maastricht Upper Area Control Centre will provide the services from 2003 onwards, followed by other centres of the described region in 2006 and 2007. This stepped implementation of data link equipped centres will allow pilots to get accustomed gradually to data link operations and is not considered a disadvantage.

2.6 Communications infrastructure

2.6.1 The communications infrastructure can be provided by air navigation service providers, by communications service providers, or by a partnership between the two. Both ARINC and SITA are ready to respond to customer request for an ATN/VDL Mode 2 service. In a number of cases they are considering the use of infrastructure owned by Air Navigation Service Providers.

2.7 Airborne equipage

2.7.1 Initially it was anticipated that the benefits of data link and the shared use for the VDL Mode 2 infrastructure for airlines operational communications and ATC communications would convince airlines to make the required avionics investments to support ATC data link. The economic situation of the last two years has made this impossible for most airlines. To overcome this situation the programme adopts a three-step approach:

- a) specific avionics integration support for pioneers (the first 100 aircraft to equip);
- b) incentives to encourage equipage; and
- c) a possible mandate for data link carriage.

2.7.2 The specific integration support is available between now and 2005 and is currently secured for 46 aircraft. All indications are that 100 aircraft will be equipped using this support within the anticipated timeframe.

2.7.3 A number of possibilities were investigated regarding incentives and finally it was decided to propose a route charge reduction for equipped aircraft. This approach recognises the fact that data link equipped aircraft lessen the pressure on the ATC system, an effect from which all users of the system benefit. It is consequently reasonable to reward them for this effort. Non-equipped aircraft bear a very small route charge increase in order to pay for the service efficiencies, available to all users, gained through the introduction of data link.

2.7.4 In the meantime the possibility of a mandate for data link is being investigated. It is generally accepted that the full benefits of data link will only become available when a large majority of flights is equipped. If this target cannot be achieved through the first two steps described above, a mandate must be put in place.

3. CONSIDERATIONS FOR A DATA LINK MANDATE

3.1 A number of considerations must be respected in the preparation for a mandate for data link, such as: the need for a mandate, the financial pressure generated by a mandate, and the availability of the ground based infrastructure.

3.2 There are several elements that support the call for a mandate for data link:

3.2.1 The full benefits of data link implementation will only be available if a large portion of the flights in a given airspace is data link equipped.

3.2.2 A mandate for data link equipage would allow the avionics and the ATC system manufacturers to plan in due time for the delivery of large quantities of equipment by the mandate time. It will also facilitate their investment decisions and minimise their business risk.

3.2.3 A mandate will also allow airlines and air navigation service providers to plan a smooth introduction of data link. Investments can be spread over time and installations can be integrated in the normal system upgrade planning.

3.2.4 The predictability of a mandate is attractive for financial departments.

3.2.5 The predictability of numbers of equipped aircraft allows capacity planners to reflect the anticipated benefits of data link in their capacity plans.

3.3 The introduction of a mandate will be organised in such a way that it minimises the financial pressure on airlines. It is proposed that the mandate applies first to new aircraft and later for aircraft that require retrofit.

3.4 To impose a mandate for airborne equipage, data link services must be available in the air traffic control centres and the communication infrastructure must be in place.

3.5 ICAO will be involved in the process of the preparation and the introduction of a mandate for data link equipage in Europe, when and where this is required.

4. **CONCLUSION**

4.1 The LINK 2000+ Programme, managed by EUROCONTROL, is coordinating the implementation of air-ground data link services for ATC in Europe. The controller-pilot data link communications will reduce controller and aircrew workload and voice congestion.

4.2 Full benefits of data link will only become available when a large majority of flights is equipped; therefore, EUROCONTROL is investigating the possible need for a mandate for data link equipage.

— END —