Directorate Single Sky/
Civil-Military ATM
Coordination Division

CMAC CNS FACTSHEET #3

Data Link Services and State Aircraft
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"EC Regulation No 29/2009 of 16 January 2009 lays down requirements on data link services for the single European sky (SES). Articles 3 and 8 of this regulation contain provisions impacting State aircraft.
The EUROCONTROL Link 2000+ Programme progresses the deployment of data link services to support an initial set of controller-pilot data link communication (CPDLC) applications in designated European airspace. It is worth noting the recent progress in terms of ground and airborne implementation.
In the longer term, data link will become the primary means of air-ground communications and will be a fundamental enabler of advanced ATM concepts towards full 4D-trajectory operations. This evolution raises interoperability challenges, in particular for the operators of transport type State aircraft that need to fly regularly as general air traffic (GAT)."
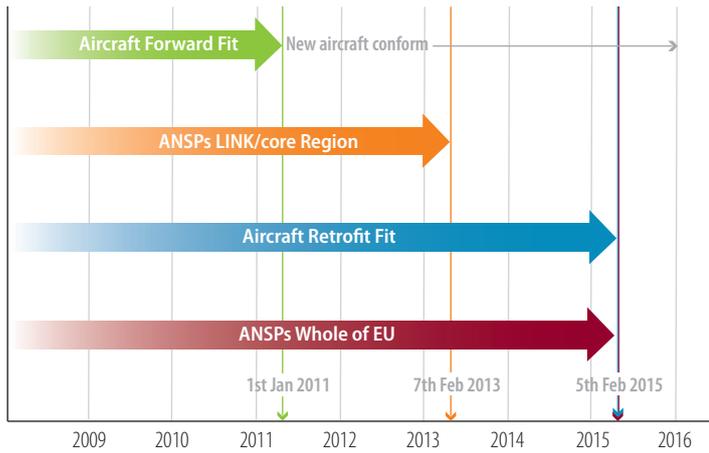
Data link services (DLS) regulation

The data link services regulation (EC Regulation No 29/2009 of 16 January 2009) mandates DLS equipage for civil aircraft from January 2011 on newly produced aircraft and declares that State aircraft are exempt. Nevertheless, it also stipulates that Member States which decide to equip new transport type State aircraft entering into service from 1 January 2014 with data link capability, relying upon standards which are not specific to military operational requirements, should ensure that those aircraft have the capability to operate the data link services defined in the Regulation (with ATN[1]/VDL Mode 2 data link technology or other communications protocol).

The EUROCAE/RTCA-standardised CPDLC services/applications mandated in this Regulation include:

- **Data Link Communications Initiation Capability (DLIC)** - to uniquely identify an aircraft and to provide version and address information for all data communications services
- **ATC Communications Management (ACM)** - to handle repetitive frequency changes
- **ATC Clearances and Information service (ACL)** - to provide standard clearances (e.g. "climb to level 350")
- **ATC Microphone Check service (AMC)** – to enable communication in the event of blocked frequencies

These services do not replace the voice as a primary means of communication – both media will always be available, thus providing mutual back-up, a definite safety improvement. In the event of non-standard communications or an emergency, "revert to voice" is the procedure.

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[1] *ATN – Aeronautical Telecommunication Network (ICAO concept)*

Aircraft Forward Fit — New aircraft conform

ANSPs LINK/core Region

Aircraft Retrofit Fit

ANSPs Whole of EU

1st Jan 2011   7th Feb 2013   5th Feb 2015

2009   2010   2011   2012   2013   2014   2015   2016

In parallel with the provisions related to aircraft equipage, the Regulation also applies to air traffic service providers (ATS providers) which are required to ensure that ATS Units providing air traffic services have the capability to provide and operate the defined data link services. This is valid for general air traffic in accordance with instrument flight rules (GAT/IFR) in airspace above FL285 in the European Union States' flight information regions (FIR) identified in the Regulation. As a consequence, the ANSPs[2] of the core region are expected to implement the ground infrastructure from 7 February 2013 and the ANSPs of the whole EU region from 5 February 2015.

Link 2000+ Programme status

Today the EUROCONTROL Maastricht Upper Area Control Centre (MUAC) and DFS[3] are already providing operational CPDLC services. Following aircraft operators' efforts, hundreds of civil aircraft are already equipped, generating more than 200,000 CPDLC flights every year. Airborne equipage efforts are progressing at a good pace, taking advantage of TEN-T funding incentives that were made available some time ago. Such equipage incentives have been available since December 2009 and will benefit more than 500 aircraft.

CPDLC implementation brings substantial benefits in terms of capacity increase, safety, reduced need to introduce new sectors, reduced controller workload per aircraft, prevention of misspelling, and leads to efficiency gains

which could translate into lower unit rates. It is estimated that with 75% of flights equipped, an increase in capacity of 11% will be achieved overall. Since the performance targets must be monitored and smooth operation guaranteed at the technical level in order for the benefits to be realised, the Link 2000+ Programme coordinates implementation and provides an extensive level of support and guidance to all civil and military ATS providers and aircraft operators.

A proposal has recently been made to create a Data Link Services - Central Reporting Office (DLS-CRO) which will operate as a central body monitoring data link operations and will solve issues affecting safety, capacity, performance and inter-operability at European level. The DLS-CRO fits within the context of the Network Manager and reports to the Link 2000+ Programme Steering Group (PSG) for decision-making. The DLS-CRO will monitor implementation and will ensure the smooth operation of CPDLC in Europe, providing the focal point for operational data collection, the investigation of problems, document repositories, sharing of experiences, etc. The DLS-CRO will be also available to provide support to transport type State aircraft operators.

Future developments

The widespread implementation of air-ground data link communications which, in the future, will replace air-ground voice (VHF) as the primary means of ATC communications, will be a fundamental enabler for the introduction of advanced concepts like 4D-trajectory operations and new separation modes.

The availability of DLS-compliant solutions (e.g. ATN/VDL Mode 2 or FANS/ACARS, during a transitional period) will be seen as an important baseline capability not only to support the first set of CPDLC services but also the Initial 4D services that will comprise some trajectory-management applications relying on the ADS-C technique in the sequence of EUROCAE/RTCA standards. For the majority of equipped aircraft, a software upgrade of VDL 2 data link avionics and possibly wiring will suffice to execute Initial 4D-trajectory services.
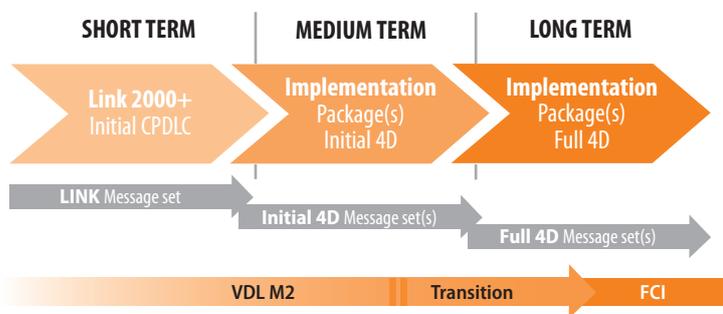
[2] *ANSP – Air navigation service provider*
[3] *DFS – Deutsche Flugsicherung*

More advanced Full 4D requirements will require the introduction of higher capacity data link technologies in the context of the Future Communications Infrastructure (FCI) initiatives comprising airport, terrestrial and satellite communications (SATCOM) data link solutions as well as a multilink environment.

It is important to highlight that data link implementations are also planned in the United States, as the DataCOMM part of the NEXTGEN Programme, and in the context of ICAO initiatives envisaged to promote global interoperability.

Data link services and State aircraft

Only a reduced number of military aircraft currently have civil data link capability (ATN/VDL 2 or FANS /ACARS). Should State aircraft operators voluntarily decide to equip transport type aircraft with a data link solution compliant with the DLS Regulation, they would be in position to accrue the benefits identified above and to be better prepared to comply with the performance targets and improvements foreseen in the European ATM Master Plan.

Concerning CPDLC services, it is important to highlight that non-equipped State aircraft will continue to be handled with voice, and that FANS/ACARS-equipped aircraft might be accommodated by some ANSPs during a transitional period. In relation to Initial 4D and Full 4D, the absence of data link capability to support the sharing of trajectory data between aircraft systems and ground ATS infrastructure will be more complex owing to the level of automation involved.

Other alternatives for civil-military data link interoperability will not be excluded but are still the subject of R&D investigation. Concrete examples are the potential reutilisation of existing military capabilities or synergies with SATCOM developments. On this last subject there have been significant developments in the context of the European Space Agency IRIS Programme that are worth being assessed in terms of eventual relevance to civil-military data link interoperability (subject to be covered by a subsequent CNS factsheet). Nevertheless, the various alternatives have not yet reached maturity, and the feasibility results of R&D projects remain uncertain until all validation and verification activities are finalised.

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FCI - Future communication infrastructure

In this case, State aircraft operations will be able to benefit from the assistance available in the EUROCONTROL Single Sky Directorate (Civil-Military ATM Coordination Division) and Link 2000+ Programme, including the DLS-CRO, for the provision of technical guidance, support to implementation and definition of subsequent interoperability developments.

More details on the Link2000+ Programme and civil-military ATM coordination CNS activities are available at the following links:

www.eurocontrol.int/link2000

http://www.eurocontrol.int/mil/public/standard_page/cns.html