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**Minimum Human Factors Standards for Air
Traffic Services Provided Via Data
Communications Utilizing the ATN,
Builds I and IA**

RTCA DO-256
June 20, 2000

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Foreword

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1.0 Purpose and Scope

1.1. Introduction

This document defines minimum human factors requirements and guidelines for air traffic services (ATS) data link communications between an air traffic specialist and a pilot utilizing the Aeronautical Telecommunications Network (ATN). The scope is the initial Controller-Pilot Data Link Communications (CPDLC) capabilities which comprise the Build I and Build IA phases of the United States (US) implementation path.

In the US, initial CPDLC capabilities will be implemented in Air Route Traffic Control Centers (ARTCCs) and available to support ATS in the contiguous domestic en route airspace radar environment. CPDLC communications will generally encompass the transition and cruise phases of flight. The initial CPDLC capabilities, discussed in this document, will not be available in US en route oceanic airspace. An early (non-ATN compatible) CPDLC service has been available in US oceanic airspace since 1995. A later phase of the US CPDLC implementation path will field an interoperable CPDLC service in domestic and oceanic en route airspace.

The operational ATS CPDLC system includes an Aeronautical Telecommunications Network (ATN) interface, the Context Management Application (CMA), and CPDLC service requirements. CPDLC message assurance and addressing requirements are supported by the ATN protocols and the CMA, respectively. Key assumptions regarding the operational environment, the role of the ATN, the CMA application, and the CPDLC services in supporting the human factors requirements are presented in the following section.

Human factors considerations are an important element of ATS CPDLC system performance. As illustrated in [Figure 1-1](#), human factors requirements address many aspects of aircraft and ground system equipment, training, and procedures. From a human factors perspective, it is critical that CPDLC ATS messages be checked for reasonableness and implications to flight safety. Moreover, because the system is expected to be used often during controller and pilot operations, the process of interacting with the ATS CPDLC system must be as simple and as easy as possible to reduce the total number of keystrokes that must be made and the amount of attention that must be paid to CPDLC operations. This document therefore contains minimum human factors requirements and guidelines needed to address CPDLC safety, error protection, ease of use, and user acceptance. These requirements will be used by designers, manufacturers, installers, and operators of the CPDLC flight deck and ground system equipment. To facilitate understanding and use of this document by these categories of readers, the requirements and guidelines are grouped into two sections: flight deck and ground system.

Compliance with these requirements is recommended as one means of assuring that the human-computer interface component of the equipment performs its intended functions satisfactorily under all conditions normally encountered in routine aeronautical operations. Any regulatory application of these standards is the sole responsibility of the appropriate governmental agencies.

[Section 1.0](#) provides information on purpose and scope needed to understand the rationale for equipment characteristics and standards stated in the remaining sections. It describes typical