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

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Foreword

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Table of Contents

1.0	Purpose and Scope	1
1.1	Introduction	1
1.2	System Overview	2
1.2.1	Current En Route CPDLC Implementation Path	2
1.2.2	System Description	5
1.3	Operational Overview	5
1.4	Assumptions	5
1.4.1	Safety Assumptions	5
1.4.2	Equipment Assumptions	6
1.4.3	Communications System Assumptions	6
1.4.3.1	ATN and Context Management Application Assumptions	6
1.4.3.2	CPDLC Service Assumptions	8
1.4.3.3	Operational Dialogue Assumptions	10
1.5	Definitions of Terms	11
1.6	Design Objectives	12
1.7	References	13
2.0	Flight Deck Requirements	17
2.1	Equipment Performance and Design Requirements	17
2.1.1	Controls	17
2.1.2.1	Layout of Controls	21
2.1.2.2	Operation of Controls	18
2.1.2.3	Shared Control Considerations	19
2.1.2.4	Menu Items and Menu Logic	20
2.1.3	Display Features	20
2.1.3.1	Symbology	20
2.1.3.2	Display Characteristics	20
2.1.3.3	Display of Data Across Multiple Pages or Windows	22
2.1.3.4	Shared Display Considerations	22
2.1.3.5	Labels	22
2.1.3.6	Color	23
2.1.4	Self Test	25
2.1.5	System Status, Mode Awareness & System Failure	25
2.1.6	Alerting	26
2.1.7	Message Handling	26
2.1.7.1	Message Queue and Display Precedence	27
2.1.7.2	Message Display and Formatting	27
2.1.7.3	Message Composition & Response	28
2.1.7.4	Message Status	28
2.1.7.5	Message Recall and History	29
2.1.8	Error Detection, Prevention and Recovery	30
2.2	Equipment Installation and Operations Requirements	30
2.2.1	Accessibility	30
2.2.2	Display Visibility	30
2.2.3	Failure Protection	31

2.2.4	Associated and/or Integrated Equipment or Systems	31
2.2.4.1	Printer	31
3.0	Air Traffic Service (ATS) Ground System Requirements	33
3.1	Air Traffic Service Specialist (ATSS) Requirements	33
3.1.1	System Performance and Design Requirements	33
3.1.1.1	General	33
3.1.1.2	Interactive Control	33
3.1.1.2.1	Layout of Data Link Keys	34
3.1.1.2.2	Interchangeability Between Input Devices	35
3.1.1.2.3	User-Computer Interaction Conventions	35
3.1.1.2.4	Menu Items and Menu Logic	35
3.1.1.3	Characteristics of Displayed Information	35
3.1.1.3.1	Color	36
3.1.1.4	System Status, Mode Awareness & System Failure	37
3.1.1.5	Alerting	38
3.1.1.6	Message Handling	38
3.1.1.6.1	Message Queue & Display Precedence	38
3.1.1.6.2	Message Display and Formatting	39
3.1.1.6.3	Message Response	39
3.1.1.6.4	Message Composition and Transmission	39
3.1.1.6.5	Message Status	40
3.1.1.6.6	Message Recall and History	42
3.1.1.7	Error Detection and Recovery	42
3.1.1.8	Offline Message Composition Capability (Menu Build)	43
3.1.1.8.1	Interactive Control	43
3.1.1.8.2	Menu Message Data Display	43
3.1.1.8.3	Menu Message Composition	44
3.1.1.8.4	Modifying/Creating Menu Entries	45
3.1.1.8.5	Menu Build Procedures	45
3.1.2	Controller Workstation Integration and Operations Requirements	45
3.2	Airway Facilities (AF) Requirements	46
3.2.1	System Performance and Design Requirements	46
3.2.1.1	General	46
3.2.1.2	Control	47
3.2.1.2.1	Layout of Controls	47
3.2.1.2.2	Operation of Controls and Input Devices	47
3.2.1.2.3	Interactive Control	48
3.2.1.2.4	Display of Menu Items and Menu Logic	49
3.2.1.2.5	Characteristics of Displayed Information	50
3.2.1.2.5.1	Color	51
3.2.1.2.6	Alerting	52
3.2.1.2.7	System Status, Mode Awareness & System Failure	52
3.2.1.2.8	Error Management	53
3.2.1.2.9	Test Messages	54
3.2.1.2.9.1	Test Message Status	54
3.2.1.2.10	Maintenance Message Display	54
3.2.1.2.10.1	Maintenance Message Recall and History	55

3.2.1.2.11 The Maintenance Manual.....	55
3.2.2 Technician Workstation Integration and Operations Requirements.....	56
3.2.2.1 Equipment Access.....	56
Membership	57

Appendices

Appendix A	Abbreviations and Acronyms Used in This Document
Appendix B	Guidance for the Use of Abbreviations and Acronyms in Composing Pre-defined Free Text Messages
Appendix C	Controller–Pilot Data Link Communications Build I/IA Message Set
Appendix D	Guidance for Flight Crew Procedures and Training
Appendix E	Guidance for Air Traffic Specialist Procedures and Training
Appendix F	Guidance for the Use of Color
Appendix G	Design Guidance for Controls
Appendix H	CPDLC Build I/IA Error Conditions and Associated Message Text

List of Figures

Figure 1-1 Human Factors Requirements in the Context of General Functional Requirements for Data Link Communication.....	3
Figure 1-2 Build IA System Architecture.....	7

List of Tables

Table C-1	Responses/Acknowledgments (Uplink).....	C-1
Table C-2	Vertical Clearances (Uplink).....	C-1
Table C-3	Crossing Constraints (Uplink).....	C-2
Table C-4	Route Modifications (Uplink).....	C-2
Table C-5	Speed Changes (Uplink).....	C-3
Table C-6	Contact/Monitor/Surveillance Requests (Uplink).....	C-3
Table C-7	Report/Confirmation Requests (Uplink).....	C-3
Table C-8	Air Traffic Advisories (Uplink).....	C-3
Table C-9	System Management Messages (Uplink).....	C-4
Table C-10	Additional Messages (Uplink).....	C-5
Table C-11	Responses (Downlink).....	C-5
Table C-12	Vertical Requests (Downlink).....	C-5
Table C-13	Reports (Downlink).....	C-6
Table C-14	System Management Messages (Downlink).....	C-6
Table F-1	Design Guidance for Coding of Selected Display Features.....	F-1
Table G-1	Design Guidance for Rotary Knobs and Keyboards.....	G-1
Table G-2	Design Guidance for Push Buttons and Toggle or Rocker Switches.....	G-2
Table G-3	Minimum Edge-to-Edge Spacing between Different Types of Controls.....	G-2
Table H-1	Error Conditions and Associated Message Text.....	H-1

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