

RADIO TECHNICAL COMMISSION FOR AERONAUTICS

Radio Technical Commission for
Aeronautics
1717 H Street, N.W.
Washington, DC 20006

UNIVERSAL AIR-GROUND DIGITAL COMMUNICATION

SYSTEM STANDARDS

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SC110/111

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FOREWORD

This report was prepared by Special Committee 110/111 of the Radio Technical Commission for Aeronautics. It was approved by RTCA on March 7, 1968.

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SECTION I

INTRODUCTION

A. BACKGROUND

Under date of March 12, 1964, the Radio Technical Commission for Aeronautics published its Document 122 (DO-122) - "Universal Air-Ground Digital Communications Systems Standards." This document recognized the need for an air-ground digital communications system capable of world-wide implementation. Its objective was the development of a set of technical standards which will provide a common source from which specifications for a family of systems, with varying levels of functional capability, can be drawn with a guarantee of inter-system compatibility and inter-operation across a diverse and broad spectrum of user needs.

As a basic step to accomplish this objective, DO-122 recommended the adoption of the American Standards Association (ASA) 7-bit Information Code as a universal standard, with provisions for the use of an 8th bit for parity check. In general, however, DO-122 defined standards only to the degree necessary to attain a logical compatibility of the framework of the universal air-ground digital communications system with the ground communications environment. It did not, for example, resolve such questions as the order of bit transmission (low or high order first) or the use of odd or even parity, nor did it finalize standards relating to Frequency and Modulation, Message Structures and Error Detection and Correction. In this regard the following is quoted from RTCA Document 122 (Section VII, paragraph C5, page 28):

> "The task of studying or specifying the significations and structure of discrete messages was not undertaken. The effort was limited to providing the skeletal structure to which these functions may be later added. The magnitude of the task of developing Format and Canned messages susceptible to Universal application is not minimized. In full recognition of this, it is recommended that it be made the subject of a subsequent Special Committee of the RTCA, to begin its efforts at such time as there is acceptance of the Universal System proposals, and basing its work not solely upon

specialized operational requirements such as air traffic control, but upon the far wider hierarchy of communications needs extant in all aspects of operating aircraft, where a basis for commonality exists."

DO-122 recommended that these tasks be made the subject of separate studies. It was on the basis of this recommendation that Special Committees 110 and 111 were established. The results of their joint endeavors are set forth in this report.

B. SUBSEQUENT DEVELOPMENTS

Since the issuance of DO-122 on March 12, 1964, several significant developments have occurred:

1. The International Standards Organization (ISO) adopted (with minor changes) the ASA Code as an international standard and identified it as ITA #5.

2. The name of the ASA was changed to the United States of America Standards Institute (USASI).

NOTE: On the basis of the changes reported in (1) and (2) above, the universal standard code for digital air-ground information interchange is identified in this report as the USASCII/ISO CODE. 1/

3. The USASI and ISO have adopted the convention of "low order first" for bit sequence and odd parity for synchronous transmissions. (These conventions will be applied to the air-ground data link.)

4. The Standard Code character assignments have been revised.

Because of these considerations, the Digital Communication System Standards set forth in this report amend and supersede those contained in DO-122.

1/ Copies of the USA Standard Code for Information Interchange (USASCII) may be obtained from The United States of America Standards Institute, 10 East 40th Street, New York, N. Y. 10016, at a cost of $2.00 each.