TELEMETRY GROUP

IRIG STANDARD 106-22

TELEMETRY STANDARDS

ABERDEEN TEST CENTER
DUGWAY PROVING GROUND
ELECTRONIC PROVING GROUND
REAGAN TEST SITE
REDSTONE TEST CENTER
WHITE SANDS TEST CENTER
YUMA PROVING GROUND

NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION PATUXENT RIVER
NAVAL AIR WARFARE CENTER WEAPONS DIVISION CHINA LAKE
NAVAL AIR WARFARE CENTER WEAPONS DIVISION POINT MUGU
NAVAL SURFACE WARFARE CENTER DAHLGREN DIVISION
NAVAL UNDERSEA WARFARE CENTER DIVISION KEYPORT
NAVAL UNDERSEA WARFARE CENTER DIVISION NEWPORT
PACIFIC MISSILE RANGE FACILITY

96th TEST WING
412th TEST WING
ARNOLD ENGINEERING DEVELOPMENT COMPLEX

SPACE LAUNCH DELTA 30
SPACE LAUNCH DELTA 45

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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DOCUMENT 106-22

TELEMETRY STANDARDS

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TELEMETRY GROUP

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New Mexico 88002-5110

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* Changed

APPENDIXES

Beginning with RCC 106-17, the appendixes that were previously stand-alone documents are now integrated with the chapters that cover the same material. This does not include four appendixes that are retired but maintained for historical purposes; these four remain stand-alone files and are renamed as annexes. The following lists new locations for the appendixes.

Changes in This Edition

This document is an updated version of and replaces Range Commanders Council (RCC) Document 106-20. The RCC Telemetry Group (TG) made an extensive effort to produce a well-coordinated and useful document. The following is a summary of these efforts.

a. Task TG-169: Updates to the Digital Telemetry Recording Standards.

   OBJECTIVE/SCOPE: Update IRIG 106 Chapters 6, 9R, 10, and 11 to include recorder capabilities required by the RCC range members.

b. Task TG-171: Updates in Chapter 9.

   OBJECTIVE/SCOPE: Update IRIG 106 Chapter 9 with updates discussed in TG 136 and 137. This task created a new sub-messages Q Group in Chapter 9.

c. Task TG-173: Add CRC to Chapter 7 TmNS Message and Ethernet MAC layer packet types

   OBJECTIVE/SCOPE: Add CRC to Chapter 7 Packet types that don't have an existing CRC. Add attribute in Chapter 9 for presence of CRC.

d. Task TG-176: Adjacent Channel Interference (ACI) Performance for Coded Waveforms.

   OBJECTIVE/SCOPE: IRIG 106 Appendix 2-A.4 contains minimum frequency spacing recommendations for the three waveforms in the standard, PCM/FM, SOQPSK, and ARTM CPM. This task will update that recommendation as needed for the coded waveforms SOQPSK-STC and SOQPSK-LDPC now in the standard. The recommendation will be based upon extensive lab testing in the Telemetry Lab with all combinations of coded and uncoded waveforms.

e. Task TG-177: IRIG 106 Chapter 2 Modulation

   OBJECTIVE/SCOPE: The three modulations in Chapter 2 (PCM/FM, SOQPSK, ARTM CPM) are currently defined correctly but are inconsistent in their definitions. This task will redefine each waveform as variants of the general case of Continuous Phase Modulation (CPM). Since FQPSK has not been adopted by the AMT community, it has been moved to Appendix 2-B.

f. Task TG-180: Augmentation of IRIG 106 Appendix 2-D with LDPC Parity Examples

   OBJECTIVE/SCOPE: Add examples in IRIG 106 Appendix 2-D, specifically D.4 and D.5, for each Low-Density Parity Check (LDPC) encoding scheme that includes information block test patterns and resulting parities.

g. Task TG-182: Data Quality Encapsulation for Coded Telemetry Links

   OBJECTIVE/SCOPE: Data Quality Metrics (DQM) and thus Data Quality Encapsulation (DQE) are gaining wide acceptance as the source selection metric for Best Source Selection (BSS). This combined with the implementation of coded telemetry links requires an update to Appendix 2-G of IRIG 106. This task will specify payload lengths in the DQE message when utilizing Space-Time Code (STC), forward error correction in the form of LDPC or a combination of both (STC-LDPC) in the telemetry link.

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Preface

The TG of the RCC has prepared this document to foster the compatibility of telemetry transmitting, receiving, and signal processing equipment at the member ranges under the cognizance of the RCC. The range commanders highly recommend that telemetry equipment operated by the ranges and telemetry equipment used in programs that require range support conform to these standards.

These standards do not necessarily define the existing capability of any test range, but constitute a guide for the orderly implementation of telemetry systems for both ranges and range users. The scope of capabilities attainable with the utilization of these standards requires the careful consideration of tradeoffs. Guidance concerning these tradeoffs is provided in the text. The standards provide the necessary criteria on which to base equipment design and modification. The ultimate purpose is to ensure efficient spectrum utilization, interference-free operation, interoperability between ranges, and compatibility of range user equipment with the ranges.

This standard is complemented by a companion series: RCC Document 118, Test Methods for Telemetry Systems and Subsystems; RCC Document 119, Telemetry Applications Handbook; RCC Document 123, IRIG 106 Chapter 10 Programmers Handbook; and RCC Document 124, Telemetry Attributes Transfer Standard (TMATS) Handbook.

The policy of the TG is to update the telemetry standards and test methods documents as required to be consistent with advances in technology.

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******** NOTHING FOLLOWS ********