Packet Telemetry at Edwards AFB with IRIG 106 Chapter 7

May 24, 2023

Mike Delaney, P.E.
812 AITS/ENIE

U.S. AIR FORCE

DISTRIBUTION STATEMENT A - Approved for public release; distribution is unlimited.
412TW-PA-23059

Overview

- Introduction
- Chapter 7 Description
- Current Use Cases at Edwards
- Future Use Cases
- Challenges and Lessons Learned
- Conclusion

IRIG 106 Chapter 7 Description

- Packetized data with SST PCM Transport
  - Chapter 11
  - Chapter 24 (TmNS)
  - Ethernet MAC Frames
  - TCP and UDP Packets
- Select words in Chapter 4 PCM or entire PCM frame
- Multiplex multiple data sources into one telemetry stream

Current Use at Edwards

- Chapter 11 Packets
  - Analog
  - Video
  - Chapter 4 PCM
  - Multiple bus data types
    - 1553, ARINC 429, Ethernet, UART
  - Generic Message Format 0
- PCM dedicated to Chapter 7

Future Use Cases

- Chapter 24 Packets
  - Instrumentation health and status
  - Ethernet DAU data

Challenges to date

- Vendor Interoperability
  - Vendor B Chapter 7 decom doesn't support Vendor A source
  - Single Vendor airborne systems
- Portable Decom Options
- UART Implementation Inconsistency
  - Future Topic for Chapter 7 Handbook

Challenges to date

- Chapter 7 configuration exchange
  - No defined format
  - Handbook or best practices – RCC TG TDP Task
    - Final Editing and Diagram Cleanup
- Bus Data EU Conversion
  - TMATS Q Group not commonly implemented
    - Introduced in IRIG 106-22
  - Program specific CSV/Excel type files
    - Custom parser software developer intensive
  - No bus ICD standard = AFTC pain point

Conclusions

- Chapter 7 is flight proven
- Uses existing range infrastructure
  - Same receivers and transport
  - May only be software change to decom
- Can mix data sources into one TM stream
- Can better add/change non-periodic data than Chapter 4 PCM