PUS Library

IACTEC Space

Overview

IACTEC-Space PUS library (*libpus*) enables payload developers to adopt ESA's Packet Utilization Standard (PUS) in a straightforward way.

Besides implementing the prescribed message formats of the PUS protocol, *libpus* goes further, providing satellite payloads with all the essential logic and functionality that they typically require. With its clear and adaptable design, developers can create PUS-compliant devices seamlessly, unlocking the benefits of adhering to a widely recognized communication standard.

Key features

- **Pure C implementation**: developed in strict accordance with safety-critical system guidelines.
- **Cross-platform compatibility**: compatible with any operating system featuring a POSIX API (successfully tested on desktop and embedded Linux).
- **Processor-agnostic**: compatible with virtually any processor architecture (verified on x86-64 and ARMv7).
- **Minimal build requirements**: minimal prerequisites — just a C compiler such as GCC, and optionally, a build system like CMake.
- **No external dependencies**: completely self-contained, eliminating the need for third-party libraries.
- **Highly customizable**: easily tailor header formats, optional packet fields, data type representations and more.
- **Unified codebase**: a single, optimized codebase offers flexibility without sacrificing performance.
- **PUS compliance**: conforms to the latest PUS version (ECSS-E-ST-70-41C).
- **Seamless onboarding**: the provided documentation includes example applications that can serve as templates for new developments.

Supported services

Developers can immediately benefit from a large set of PUS services and messages already implemented by *libpus*:

- **ST[01] request verification**:
  - Acceptance and reporting: TM[1,1], TM[1,2].
  - Execution reporting: TM[1,3], TM[1,4], TM[1,5], TM[1,6], TM[1,7], TM[1,8]
  - Routing and reporting: TM[1,10].
- **ST[03] housekeeping**:
  - Housekeeping reporting: TC[3,5], TC[3,6], TC[3,31], TC[3,33], TM[3,35], TC[3,27], TM[3,25].
  - Diagnostic reporting: TC[3,7], TC[3,8], TC[3,32], TC[3,34], TM[3,36], TC[3,28], TM[3,26].
- **ST[05] event reporting**:
  - Event reporting: TM[5,1], TM[5,2], TM[5,3], TM[5,4], TC[5,5], TC[5,6], TC[5,7], TM[5,8].
- **ST[06] memory management**:
  - Raw data memory management: TC[6,2], TC[6,5], TM[6,6].
  - Structured data memory management: TC[6,1], TC[6,3], TM[6,4].
- **ST[17] test**:
  - Test: TC[17,1], TM[17,2], TC[17,3], TM[17,4].
- **ST[20] parameter management**:
  - Parameter management: TC[20,1], TM[20,2], TC[20,3].
- **ST[23] file management**:
  - File handling: TC[23,1], TC[23,2], TC[23,3], TM[23,4], TC[23,9], TC[23,10], TC[23,11], TC[23,12], TM[23,13].
  - File copy: TC[23,14], TC[23,15].

For more information, please contact us at:

iactec.space@iac.es