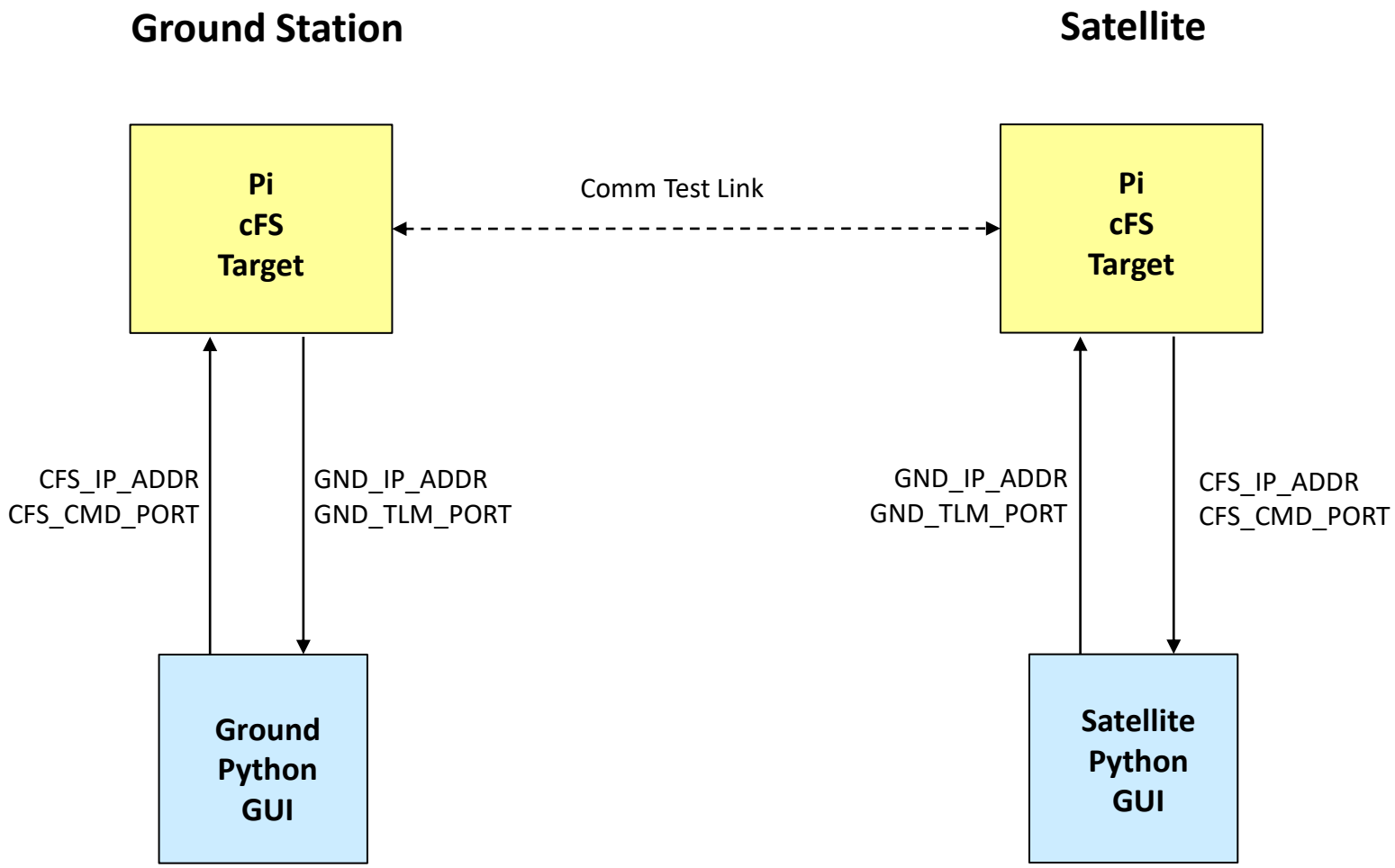
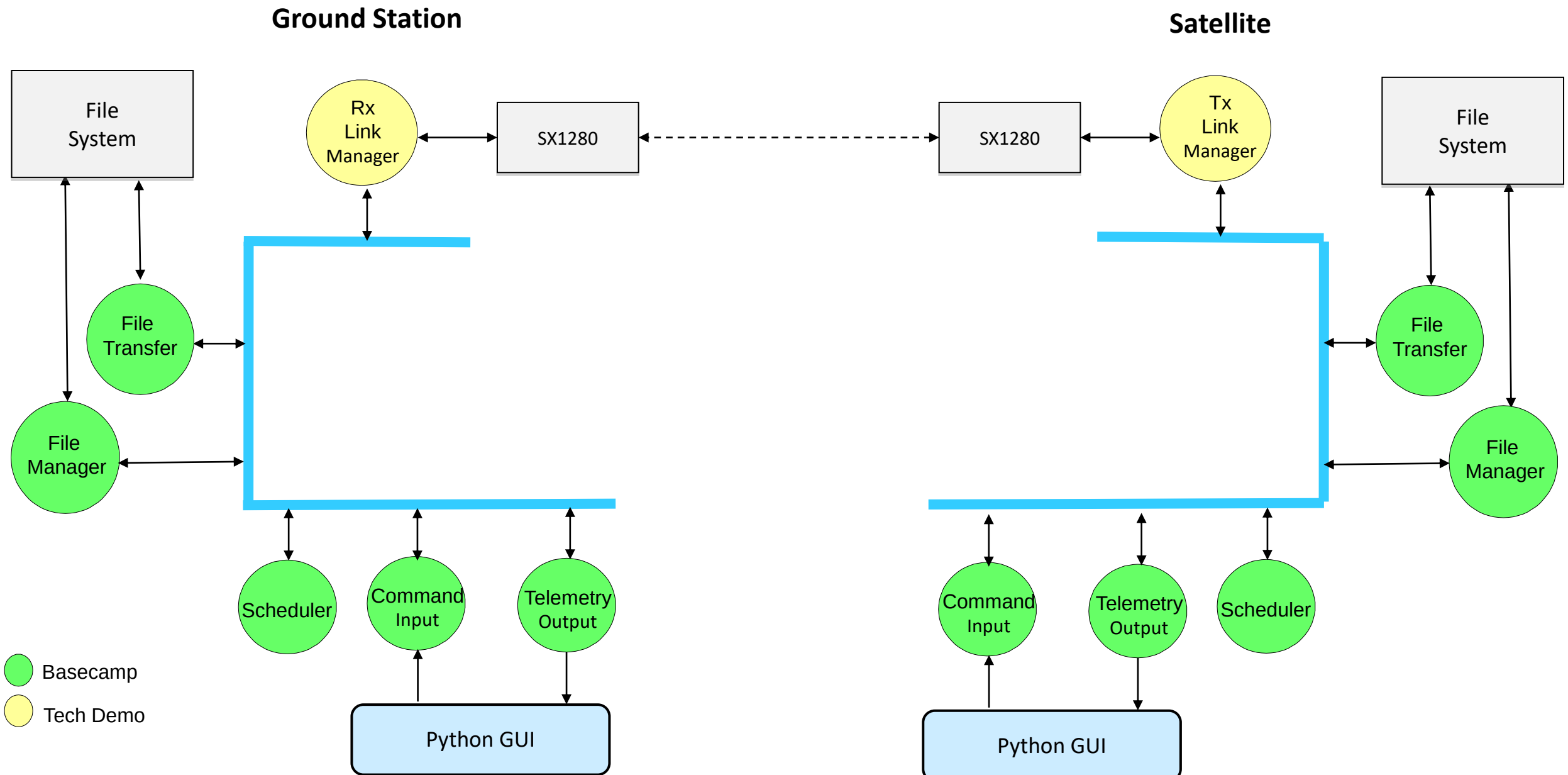
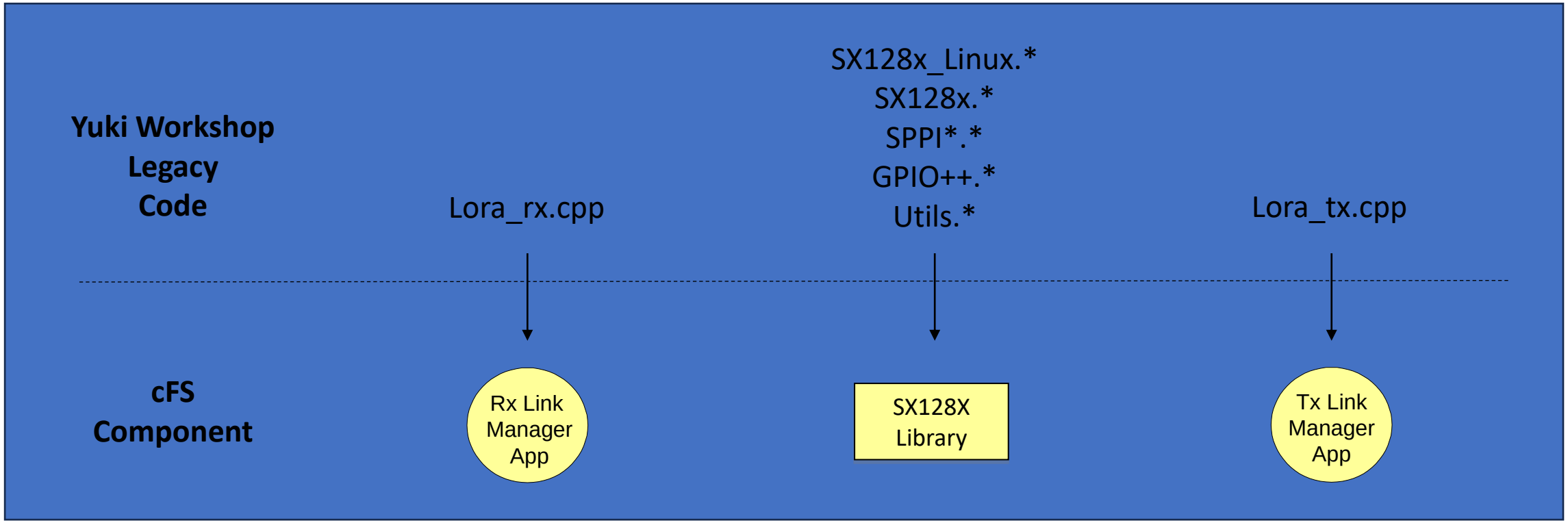
Pi-to-Pi Comm Tech Demo



Pi-to-Pi Comm Tech Demo cFS Apps



Adapting Legacy Code

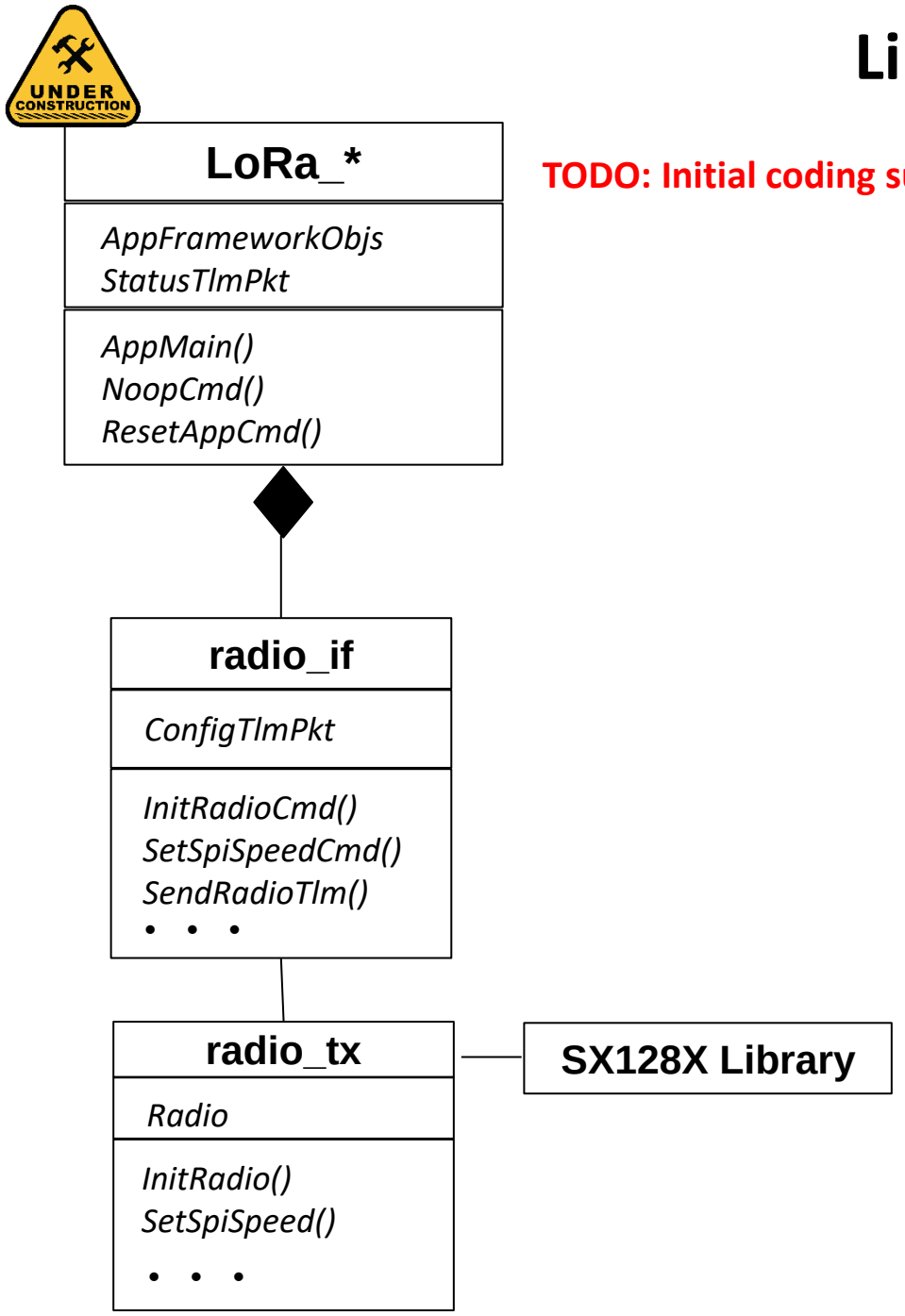


- Keep legacy hardware interface design and encapsulate interface code in a cFS library
- The link manager apps are a mix of C++ and C code
- Legacy code works so in the first phase minimize risks by using it
- If desired, perform a second phase that refactors legacy code into a cFS child task model

Design Highlights

- **Minimize changes to legacy code**
  - Encapsulate all legacy code except the main C function in a cFS library
- **Use separate Receive(Rx) and Transmit(Tx) apps that manage the communications demo**
- **App JSON init file contains default configurations**
- **Commands**
  - Provide radio configuration commands to change default settings
  - Provide demo management commands to start/stop data transfers
- **Telemetry**
  - Send a 1Hz status telemetry message containing comm state information
  - Upon command, send a radio telemetry message containing radio configurations
- **The Tx app's child task manages the transfer of file data**

Link Manager App Design



TODO: Initial coding suggests that large portions of radio_if and radio_tx could migrate to SX128X_LIBRARY

LoRa_*

- Ground command and telemetry interface

radio_if

- Written in C
- Provides an adapter between C and C++ code
- Contains child task function that manages file transfer

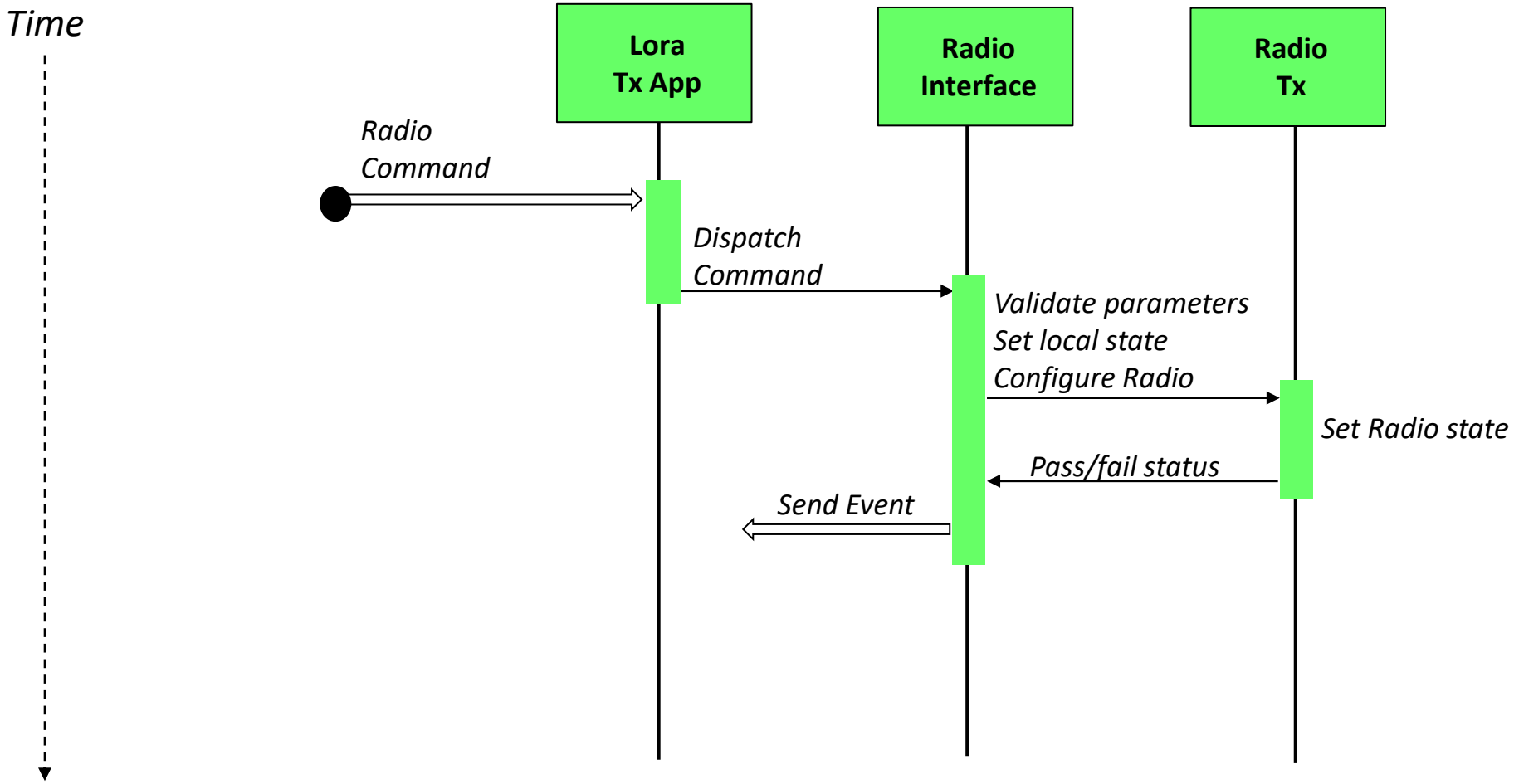
radio_tx

- Written in C++
- Contains an instance of an SX128x_Linux object

Notes

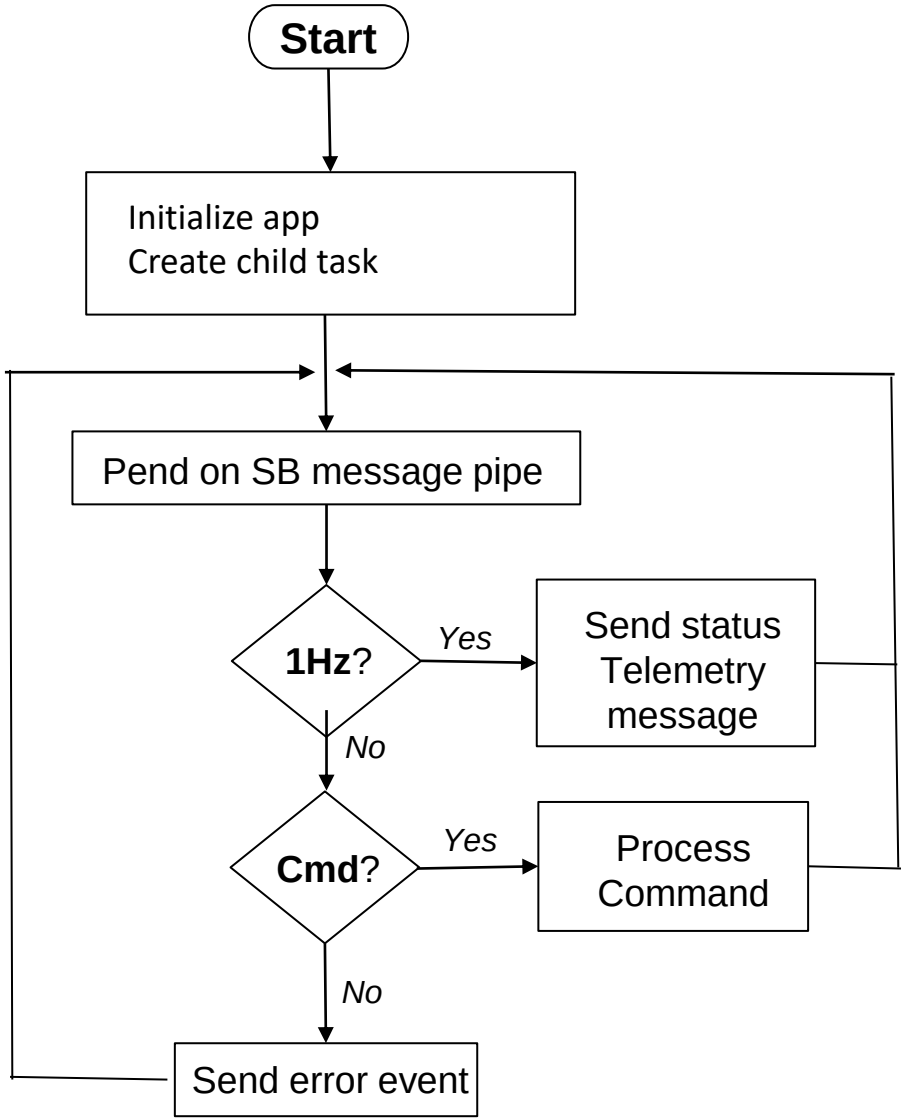
- The original design combined radio_if and radio_tx into a single object, however using extern “C” { #include cfe.h} results in compiler errors so separate radio objects were created

Radio Configuration Command



Transmit App Control Flow

Main App



Radio I/F Child Task

Adding a Command

1. Define the command in EDS spec file lora_*.xml
2. Define the command function prototype in radio_if.h
3. Define the command function content in radio_if.c
    1. Call radio_* functions as needed
4. Register the command in lora_tx's AppInit() function using CMDMGR_RegisterFunc()
5. If command is a configuration command then add default to JSON init file
    1. Define in app_cfg.h
    2. Add to init file
    3. Set default in radio_if.c constructor

SX128X Library Design

TODO – Make object diagram