Satellite Software overview

01/05/2019, 02/05/2019

1. On Satellite Power On
   1. Configure the direction (INPUT/OUTPUT) of each pin used by external electronics on the microcontroller
      1. GPIO.
   2. Check whether the EEPROM requires zeroing by reading a pin INPUT.
      1. Used for resetting memory when debugging.
   3. Increment/Initializes the ***restart counter*** EEPROM location and load it into RAM.
   4. Raise the STARTED flag in the communication system.
   5. Initialize the RadioLib module with the configured settings to check that the settings are valid.
   6. Configure the temperature TMP100 sensors resolution.
   7. For integration testing, transmit a callsign after 90 seconds and then after 5 minutes begin the deployment.
   8. Check battery temperature and turn charging on/off depending on the temperature.
2. On Satellite Loop()
   1. If the STOP flag is raised, signal to the hardware watchdog to restart the satellite.
   2. Check the battery’s temperature and switch charging accordingly.
   3. Switch the SX1278 to LoRa modem mode
      1. Transmit the system information packet.
      2. Wait to receive LoRa transmissions with a timeout.
         1. If a transmission is received, check the password and trigger the corresponding function in the communications system router.
      3. Check against STATE flags and transmit accordingly.
   4. Switch the SX1278 settings to the ISM band.
      1. Wait to receive LoRa transmissions with a timeout.
         1. If a transmission is received, check the password and trigger the corresponding function in the communications systems router.
      2. Check against STATE flags and transmit accordingly.
   5. Switch the SX1278 the FSK modem mode.
      1. Wait to receive FSK transmissions with a timeout.
         1. If a transmission is received, check the password and trigger the corresponding function in the communications function set.
      2. No FSK downlink/TX.
   6. If the satellite RTTY counter exceeds the limit, transmit RTTY.
   7. Put the SX1278 radio into Standby mode to save power.
   8. Sleep the microcontroller for an interval defined as am inverse function of the current battery level.