CMD execution:

WSN initialization

Setup interrupts

GPS setup (called repeatedly until successful, or until watchdog timeout (wdt) triggers a reset)

Watchdog reset

Gyroscope setup (called repeatedly until successful, or until wdt triggers a reset)

Watchdog reset

ADC (for magnetometer) setup (called repeatedly until successful, or wdt triggers a reset)

Watchdog reset

SD initialization (called repeatedly until successful, or until watchdog timeout triggers a reset)

SPI begin

File initialization (called repeatedly until successful, or until watchdog timeout triggers a reset)

Set unfinished files

Set orbit

(Set) Set next file to write to

Write header for files

Watchdog reset

Radio initialization (called repeatedly until successful, or until watchdog timeout triggers a reset)

Rf22 initialization

Rf22 set modem configuration

Rf22 set TX power

Dummy data test

Watchdog reset

Science mode check (occurs if is science mode returns true)

Update latitude (called repeatedly until valid GPS string is entered)

decode GPS string (GPS.encode()???) (only called if GPS string is received)

battery check

SD.exists (check if a file for this orbit already exists)

SD.open to read contents of file for this orbit (only called if file for this orbit already exists)

Science mode

Interrupt driven:

At every 33 second interval magnetometer data is collected

Data is appended to a string waiting to be written to file

At every 100 millisecond interval gps and gyroscope data is collected

Data is appended to a string waiting to be written to a file

Inbetween interrupts:

Write data string (only if there are enough characters to fill full radio message length)

Update latitude

If la

Data transfer mode check

Battery check (return false if battery modes are insufficient)

Update latitude (return false if latitude is not in data transfer mode region)

Read header of this orbit’s file (return false if file size is too small to send)

Wait for transfer start command (only if no previous functions returned false)

Send message to mule saying done with science mode

Listen for command to start transfer mode from mule

Update latitude

Transfer mode

File send (Prepare message to be sent to mule)

File done (only if file could not be open successfully)

The following are done repeatedly in a loop till the file is done sending

Get line from file

Radio send (transmit message to mule)

Update position in file

Update header of file

Update latitude (return from loop if latitude indicates transfer mode is done) File done

Set status of file as sent successfully or not sent successfully

Update header of the file

Wait

Wait orbit finish

Update latitude (called repeatedly until we are ready to enter science mode

Update orbit values

Create new file for new orbit

Write header for new file