1 – Software Functional Specification

# Changelog

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| Date | Author(s) | Confirmation Signature(s) | Description |
| 05/05/2019 | Richard Bamford |  | Defined initial functional specification. |
| 05/05/2019 | Richard Bamford |  | Changelog added |
| 08/05/2019 | Richard Bamford, Julian Fernandez |  | * Reviewing the function specification to ensure everything is defined. * Confirmation to software test. * Removed SYSFS12 |
| 29/05/2019 | Richard Bamford |  | * Added COMMFS19 |
| 30/05/2019 | Richard Bamford |  | * Added COMMSF20 |
| 03/06/2019 | Richard Bamford, Julian Fernandez |  | * Added COMMSFS21, COMMSFS22, COMMSFS23 |
| 10/06/2019 | Richard Bamford |  | * Added COMMSFS24 |

# Software Functional Specification

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| ID | Date Set | Function |
| SYSFS1 | 04/05/2019 | Initialization and setup of program memory on startup. |
| SYSFS2 | 04/05/2019 | On jettison the deployment sequence shall run. |
| SYSFS3 | 04/05/2019 | Connected components are initialized and checked. |
| SYSFS4 | 04/05/2019 | Error codes given from the radio library must be checked and interpreted. |
| SYSFS5 | 04/05/2019 | MPPT circuit must be switched to read battery or charging values. |
| SYSFS6 | 04/05/2019 | Interval in Arduino loop function must be based on the battery voltage. |
| SYSFS7 | 04/05/2019 | Charging circuits must be disabled when temperature is less than 1 degrees Celsius. |
| SYSFS8 | 04/05/2019 | Communication system will be able to interpret LoRa and FSK transmissions. |
| SYSFS9 | 04/05/2019 | Communication system will transmit messages using the LoRa chip. |
| SYSFS10 | 04/05/2019 | Communication system will transmit RTTY messages. |
| SYSFS11 | 04/05/2019 | Radio must be put into standby mode when not in use. |
| SYSFS12 | 03/06/2019 | Satellite enters low power mode when battery voltage is below 3.3v. |
| SYSFS13 | 10/06/2019 | Low power mode, MPPT temperature switching and MPPT disable/enable saved to EEPROM and loaded from EEPROM. |
| SYSFS14 | 10/06/2019 | Ensure satellite has enough memory for the program. |
| COMMFS1 | 04/05/2019 | Ground stations will be notified when the satellite starts up. |
| COMMFS2 | 04/05/2019 | Ping transmissions will be responded with a Pong transmission. |
| COMMFS3 | 04/05/2019 | The callsign is programmable. |
| COMMFS4 | 04/05/2019 | Transmissions can be enabled. |
| COMMFS5 | 04/05/2019 | Transmissions can be disabled |
| COMMFS6 | 04/05/2019 | Transmissions require a password. |
| COMMFS7 | 04/05/2019 | Transmissions can be repeated. |
| COMMFS9 | 04/05/2019 | Ground station receives the system information message every loop. |
| COMMFS10 | 04/05/2019 | Ground Station can reset the EEPROM, maintaining the deployment state. |
| COMMFS11 | 04/05/2019 | Ground Station can restart the satellite. |
| COMMFS12 | 04/05/2019 | Ground stations will be notified when the satellite shuts down. |
| COMMFS13 | 04/05/2019 | Ground stations will be notified of a deployment sequence. |
| COMMFS14 | 04/05/2019 | Transmissions enabled/disabled state must persist across restarts. |
| COMMFS15 | 04/05/2019 | Transmissions can re-transmit a given transmission. |
| COMMFS16 | 04/05/2019 | Transceiver can switch between ISM and Amateur bands. |
| COMMFS17 | 04/05/2019 | Deployment sequence can be manually started through a command. |
| COMMFS18 | 04/05/2019 | Separate non-protocol defined PING receive must bypass password protection. |
| COMMFS19 | 29/05/2019 | Satellite can transmit a SF7 callsign message when it receives a Transmit SF 7 Callsign command. |
| COMMSFS20 | 30/05/2019 | Satellite can switch its transmission spreading factor from SF11 to SF10 and back again. |
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| COMMSFS22 | 03/06/2019 | MPPT circuits can be enabled and disabled depending on battery temperature. |
| COMMSFS23 | 03/06/2019 | Low power mode and sleep interval can be disabled and enabled via a command. |
| COMMSFS24 | 10/06/2019 | MPPT circuits can be enabled and disabled via a command. |
| DEBUGFS9 | 04/05/2019 | Deployment sequence notifies development team during integration tests before actual deployment. |