1 – Requirements

FOSSASAT-1B

FOSSA Systems

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# Changelog

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| --- | --- | --- |
| Date | Description | Author |
| 08/01/2020 | * Created initial document. * Added HREQ1 to HREQ25 * Added LREQ1 to LREQ5 * Merged initial requirements and separated into high and low level. | Richard Bamford |
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# High Level Requirements Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Description | Author | Functional requirement? (Y/N) | Reference ID |
| HREQ1 | The satellite shall communicate with other generic and widely used radio systems. | Richard Bamford | Y |  |
| HREQ2 | The satellite must be able to be silenced via a command. | Richard Bamford | Y |  |
| HREQ3 | The satellite must transmit with a callsign for identification. | Richard Bamford | Y |  |
| HREQ4 | The satellite must protect sensitive commands with AES encryption. | Richard Bamford | Y |  |
| HREQ5 | The satellite must be able to operate from a battery. | Richard Bamford | Y |  |
| HREQ6 | The satellite must be able to re-charge using the solar panels. | Richard Bamford | Y |  |
| HREQ7 | The satellite must deploy its solar panels. | Richard Bamford | Y |  |
| HREQ8 | The satellite must be able to give a ground station its system information on command. | Richard Bamford | Y |  |
| HREQ9 | The radio power and operation shall not exceed or violate the regulated standards. | Richard Bamford | Y |  |
| HREQ10 | The radio communications shall not harm other radio communicating devices. | Richard Bamford | Y |  |
| HREQ11 | The satellite must be able to restart itself on command. | Richard Bamford | Y |  |
| HREQ12 | The satellite must be able to operate with no MCU issues such as memory leaking/halting. | Richard Bamford | Y |  |
| HREQ13 | The satellite must switch on once it is jettisoned. | Richard Bamford | Y |  |
| HREQ14 | The satellite must be able to orbit for at least 1 year. | Richard Bamford | Y |  |
| HREQ15 | The satellite’s radio must be able to be configured remotely. | Richard Bamford | Y |  |
| HREQ16 | The satellite must be able to handle software and hardware errors. | Richard Bamford | Y |  |
| HREQ17 | The communications protocol shall be open source. | Richard Bamford | N |  |
| HREQ18 | The communications protocol must be accessible and therefore simple. | Richard Bamford | N |  |
| HREQ19 | There shall be no malicious transmissions. | Richard Bamford | N |  |
| HREQ20 | The satellite must be able to operate at a low power mode. | Richard Bamford | Y |  |
| HREQ21 | The satellite’s hardware must be able to withstand operational conditions. | Richard Bamford | Y |  |
| HREQ22 | The satellite’s hardware must be destroyed on de-orbiting. | Richard Bamford | Y |  |
| HREQ23 | The satellite’s orbital TLE must be available to the public. | Richard Bamford | N |  |
| HREQ24 | The satellite must be registered with Satnogs to ensure ground station coverage. | Richard Bamford | Y |  |
| HREQ25 | The satellite must remain in a benign state during launch. | Richard Bamford | Y |  |
| HREQ26 | The satellite must be able to communicate using the FOSSA Protocol. | Richard Bamford | Y |  |

# Low Level Requirements Specification

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | Description | Author | Reference IDs |
| LREQ1 | The satellite must be able to transmit using RTTY. | Richard Bamford | HREQ1 |
| LREQ2 | The satellite must be able to transmit using LoRa. | Richard Bamford | HREQ1 |
| LREQ3 | The battery must stop charging if temperature goes below 0 degrees Celsius. | Richard Bamford | HREQ5 |
| LREQ4 | The satellite must enter a low power mode when not in use. | Richard Bamford | HREQ14 |
| LREQ5 | Low power mode must be saved and retrieved from EEPROM. | Richard Bamford |  |
| LREQ6 | Callsign must be saved and retrieved from EEPROM. | Richard Bamford |  |
| LREQ7 | The battery temperature switch must be saved and retrieved from EEPROM. | Richard Bamford |  |
| LREQ8 | The frequency band must be able to switch between X.XXX, Y.YYY, Z.ZZZ | Richard Bamford | HREQ1, HREQ9 |
| LREQ9 | The spreading factor must be able to switch between X,Y,Z | Richard Bamford | HREQ9 |
| LREQ10 | The sync word must be compatable with all devices, set to X | Richard Bamford |  |
| LREQ11 | The satellite must be able to communicate using Morse Code. | Richard Bamford | HREQ1 |
| LREQ12 | The satellite must stop transmissions when X command received. |  |  |

# Bibliography

**There are no sources in the current document.**