SatNOGS COMMS

OSCW, 2019

Ilias Daradimos, Manolis Surligas
ilias@libre.space, manolis@libre.space
Libre Space Foundation

European Space Agency
Agence spatiale européenne

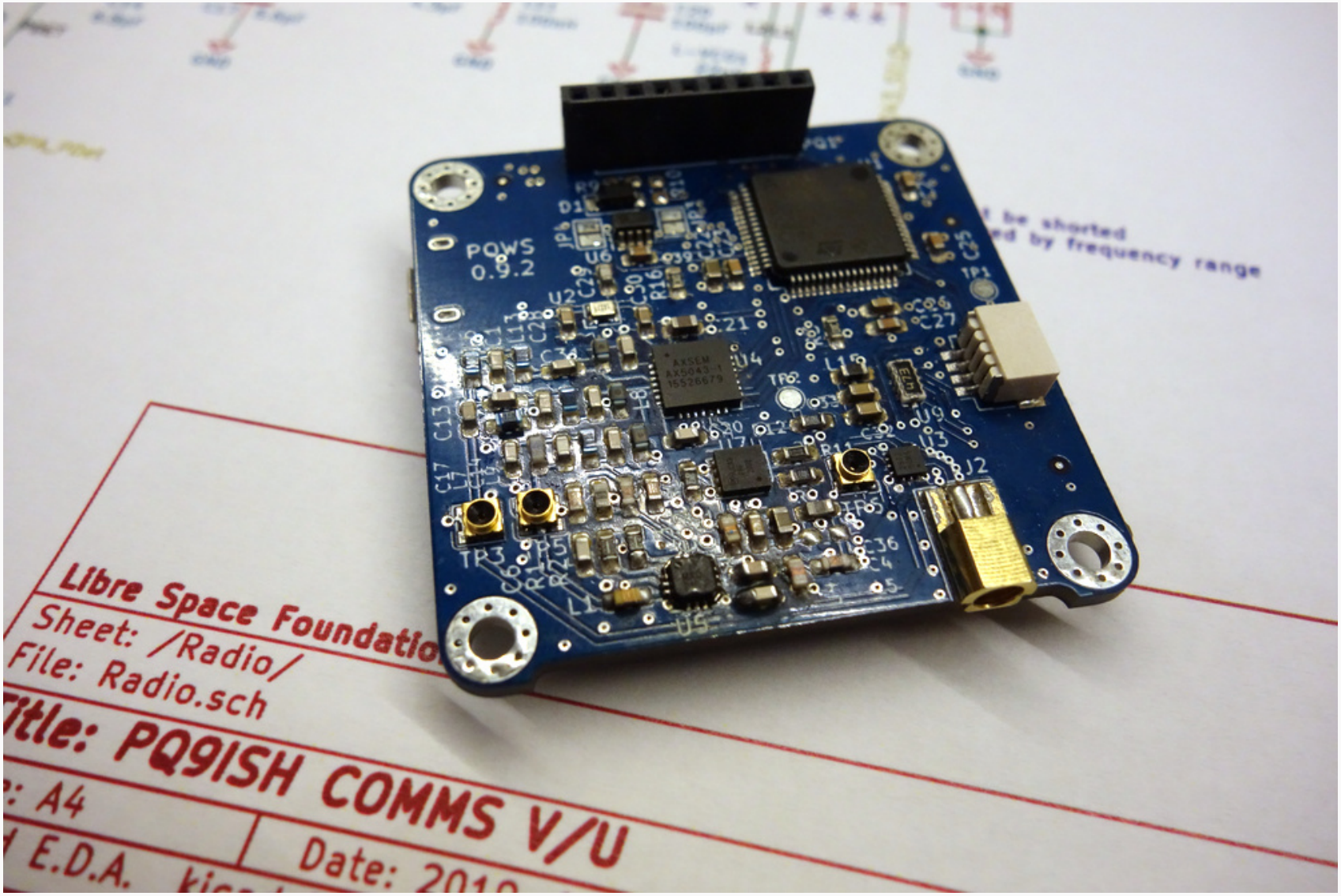
Classification

COMMS	Power	Classification
OK	OK	Satellite
Fail	OK	Debris
OK	Fail	Debris
Fail	Fail	Debris

How long?

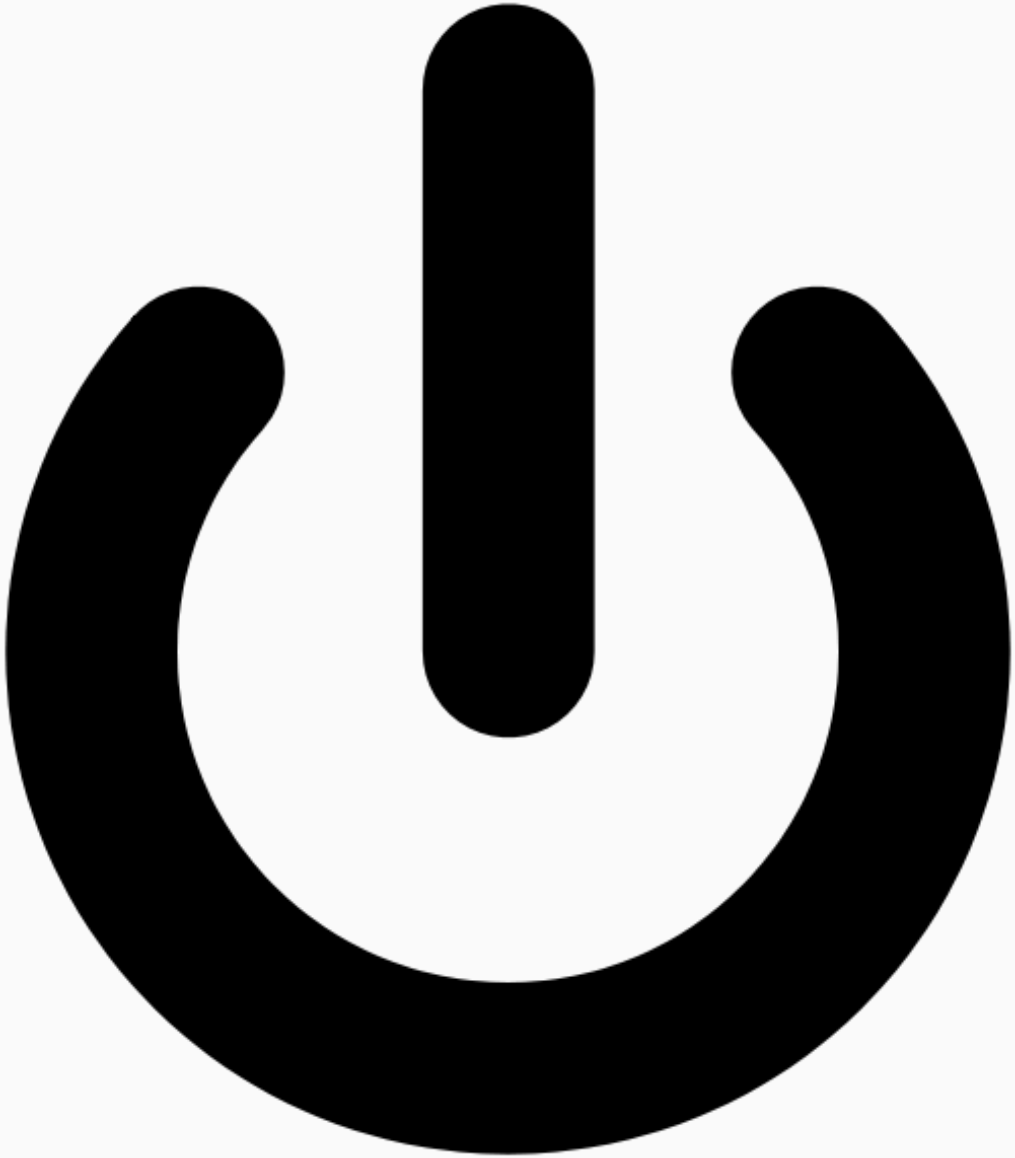
- Design and build COMMS subsystem
- Design and build ground station
- Send "Hello World"

What if...

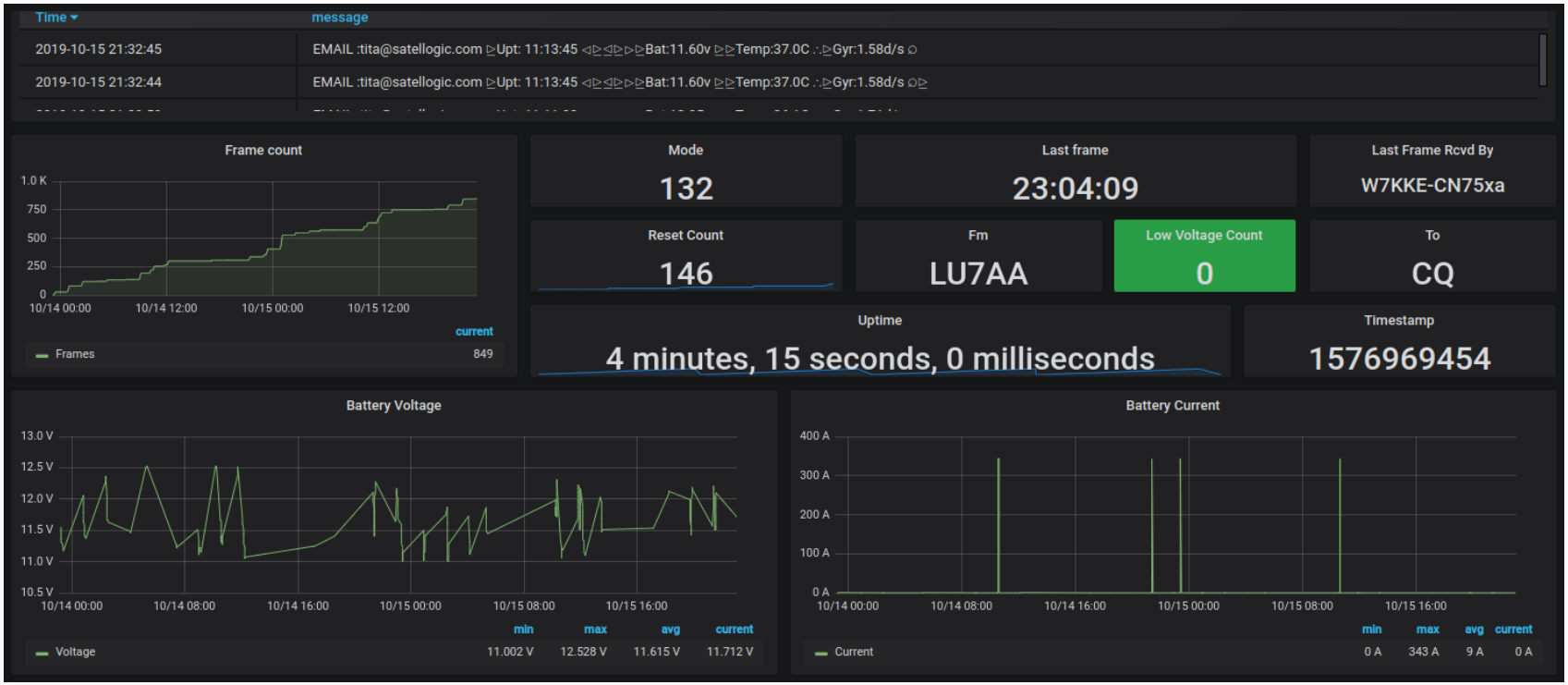

PQWS
0.9.2
Libre Space Foundatio
Sheet: /Radio/
File: Radio.sch
itle: PQ9ISH COMMS V/U
: A4
E.D.A.
Date: 2019

Add SatNOGS station...

Apply power...



Get Telemetry



The Project

- An ESA GSTP project
- 14 months duration
- Co-founded by Libre Space Foundation

The goal!

Provide an open-hardware open-software TRL-6/7 10×10 cm communications board suitable for cubesats, with seamless SatNOGS network integration

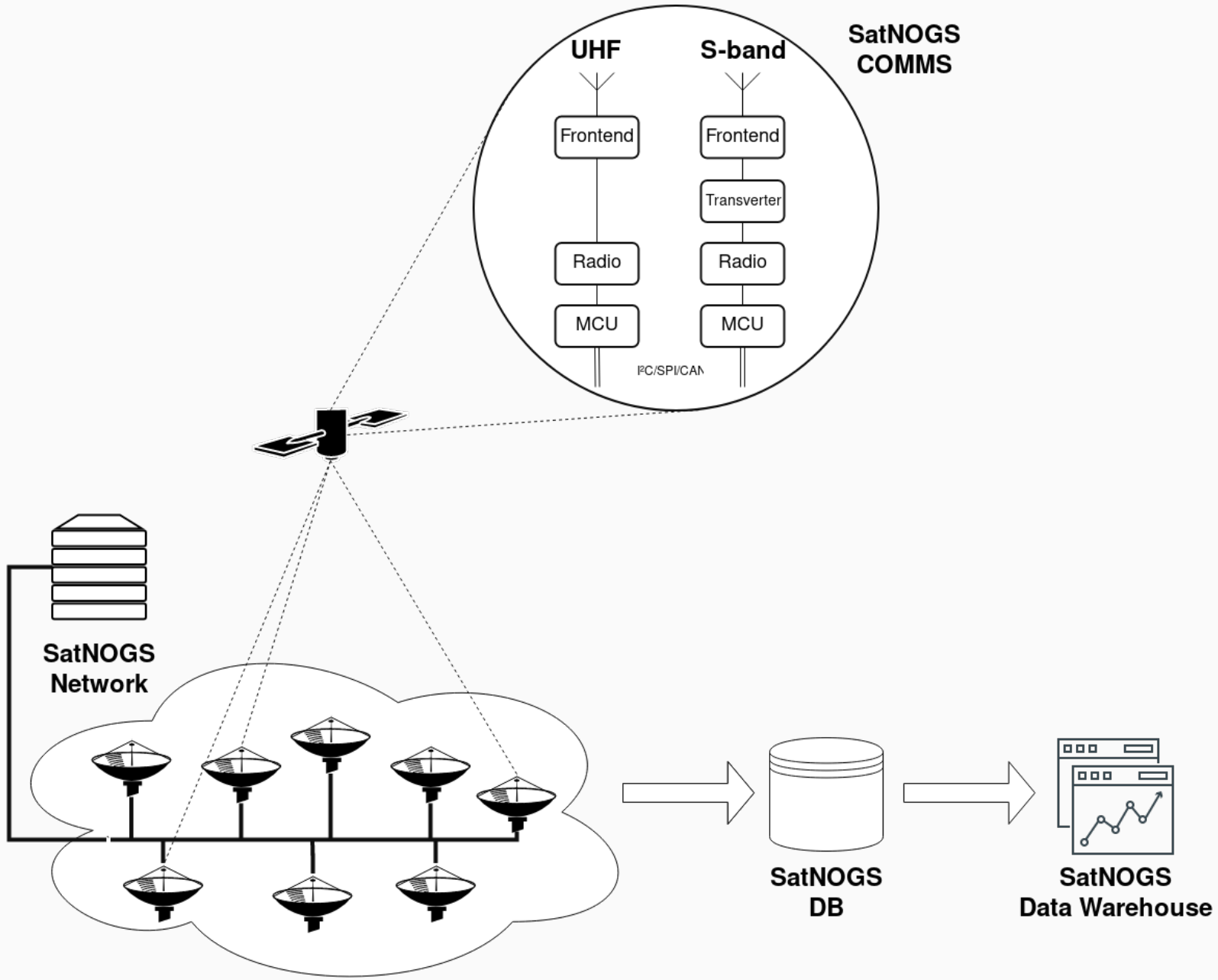
Space Segment

- Two RF interfaces with downlink/uplink capabilities
  - UHF
  - S-Band
- Separate power management
  - Enable/Disable subsystems on demand
  - Over current protection
  - Logging
- MCU for controlling peripherals and basic stuff
- FPGA for demanding applications

Ground Segment

- Telemetry format template
- Dashboard
- TX Capability

Overview


UHF
S-band
SatNOGS
COMMS
Frontend
Frontend
Transverter
Radio
Radio
MCU
MCU
I²C/SPI/CAN
SatNOGS
Network
SatNOGS
DB
SatNOGS
Data Warehouse

RF Characteristics

- UHF
  - TX Power: 1 W
  - Modulations: GFSK, GMSK, BPSK, QPSK
  - TX data rate: 2400 - 19200 kbit/s
  - RX data rate: 1200 - 9600 kbit/s

- S-Band
  - TX Power: TBA
  - Modulations: CCSDS BPSK, QPSK, IEEE 802.15.4
  - TX/RX data rates: Up to 900 kbit/s

SDR Capabilities

- TX/RX SDR capabilities in the S-Band
- 13-bit LVDS interface with the FPGA
- Reference code for CCSDS TX/RX in SDR mode
- Reference code for spectrum analysis, cognition

Pricing

- With one you get two!
- 1900 € for a flight model plus a free engineering model!

Thank you