PIT TALK

March 7, 2023

Oregon RFID

Since 2003

Agenda

Purpose of PIT Talks

Conferences

2.0 Firmware

Antenna Analysis with ORSR/ORMR

Open discussion

Purpose of PIT Talks

A place to meet and chat about PIT technology. The date of the next meeting and a link to the PIT Forum is here.

https://www.oregonrfid.com/pit-talk

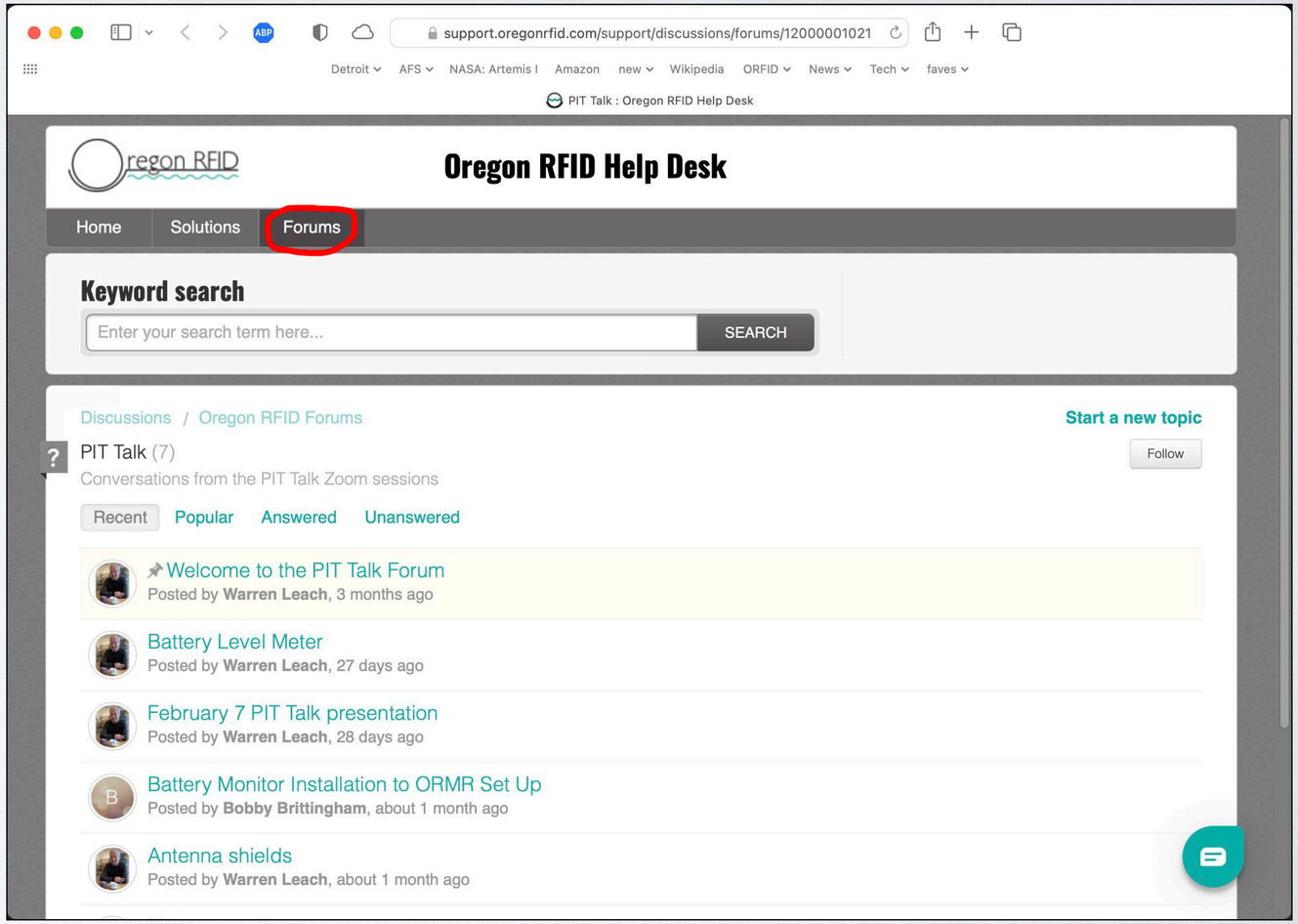
There are no plans to record or store them, however documents, photos can be shared on the PIT Forum.

Product support questions should continue to be sent to

support@oregonrfid.com

PIT Forum

The PIT forum contains presentations from previous PIT talks and is a place to share messages with others and continue the discussion between PIT Talks.



MEETINGS

AFS WA-BC Chapter Annual Meeting in Bellingham

Antenna Workshop on Monday, March 20 *https://wa-bc.fisheries.org*

Latin America and Caribbean Fisheries Congress, Cancun in May

AFS Western Division Meeting, Boise in May

AFS National Meeting, Grand Rapids in August

Webinar planned for Eastern North America at 10 AM Eastern US, CA

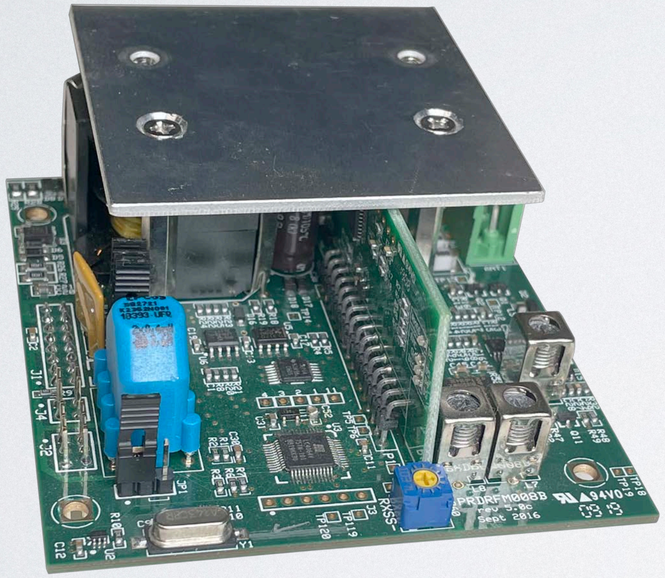
2.0 FIRMWARE

Delayed Problems appeared during testing.

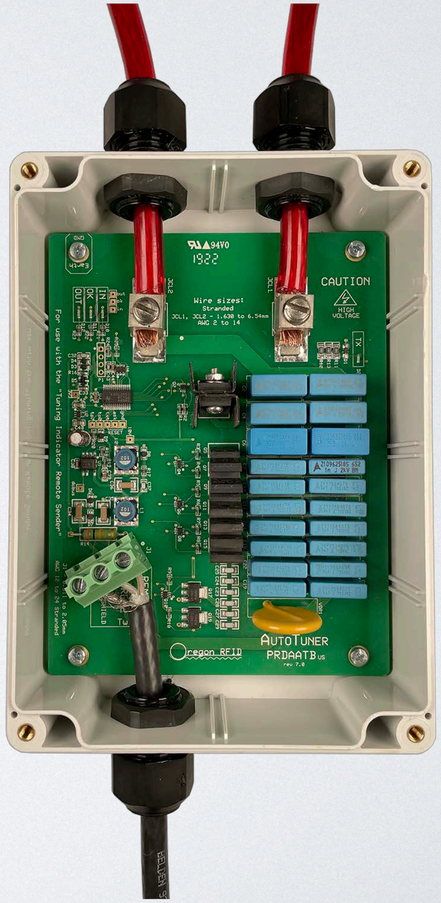
The ORSR will have special firmware for mobile operation to add useful features including mop-up mode and the UT command to list all detections for a selected tag. The reader network functions will only be available in the non-mobile version.

The next release of the ORFID Android app will use the UT output to plot the path of a selected tag on a map using the GNSS locations recorded by the datalogger.

Antenna Analysis with ORSR/ORMR



- Capacitance
- Inductance
- Voltage
- Amperage
- Effective Series Resistance
- Q



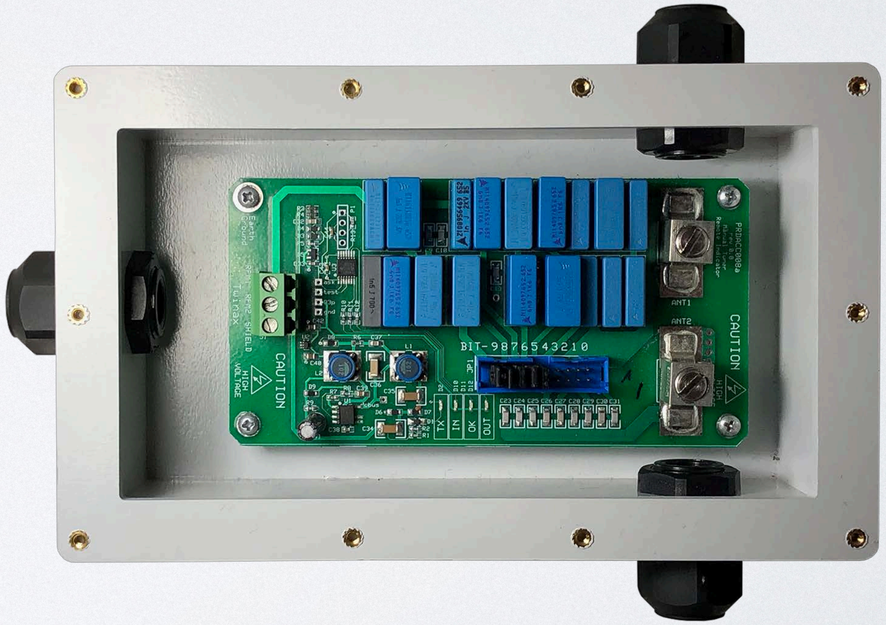
RFM009 and Autotuner are required

Capacitance

A measure of electrical capacity. The capacitance value of the manual and autotuners are adjusted over a range, depending on the combination of fixed capacitors chosen.

Manual tuners have shunts that are moved to tune to frequency.

The reader selects the capacitors in the autotuner that have the peak power level.



Inductance

A measure of magnetic capacity of a wire loop. Inductance can be increased by increasing the loop area (bigger antenna) or adding more turns of wire.

An inductor (wire loop) connected to electrical capacitors form an electrical circuit that will resonate (ring) at a frequency determined by these formulas.

$$f = \frac{1}{2\pi\sqrt{LC}}$$

At 134.2 kHz, this simplifies to

$$C = \frac{1406.485}{L}$$

Antenna Voltage

The HDX reader generates an oscillating electrical signal at 134.2 kHz that causes the antenna to resonate. The resistance of antenna wire and the inductance of the loop affects the voltage generated by the antenna.

A thicker or shorter antenna wire will increase the voltage.

Antenna Amperage

The magnetic field strength is directly related to the electrical current passing through the antenna wire. The larger the amperage, the stronger the field.

A strong magnetic pulse will charge a tag faster but the same antenna is used to detect the returning signal. A PIT antenna is a balance between generating a strong charge pulse while having good listening sensitivity.

Effective Series Resistance

The resistance of the antenna wire controls the antenna power level when generating a charge pulse. ESR is the sum of the DC and AC resistance which changes with the signal frequency. The ESR displayed is measured at 134.2 kHz.

The wire resistance is affected by the diameter (gauge) and length. The ESR is displayed after the antenna Q is measured.

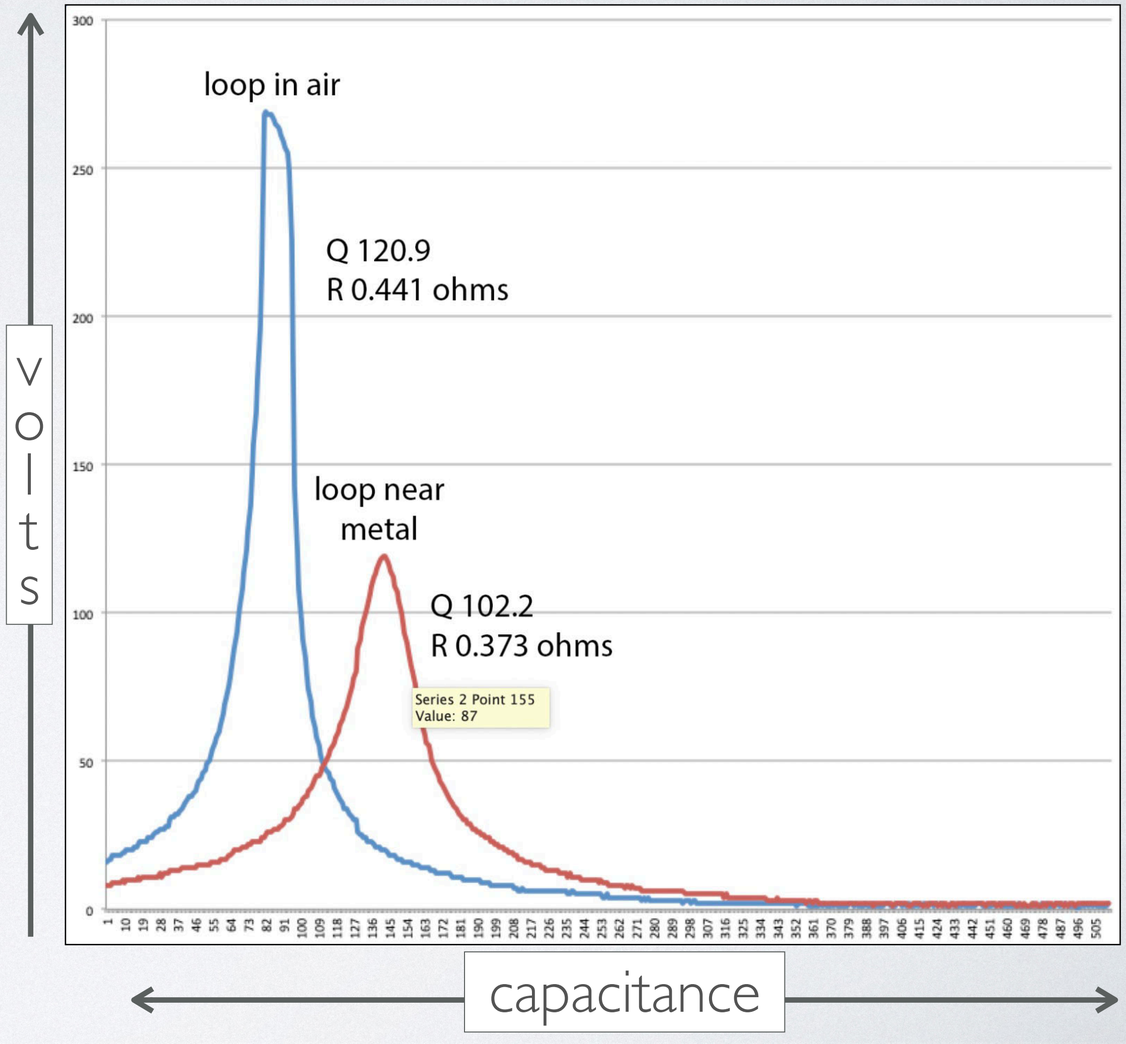
Antenna Q

The Q plot shows the antenna's response over a frequency range with a peak voltage when in tune.

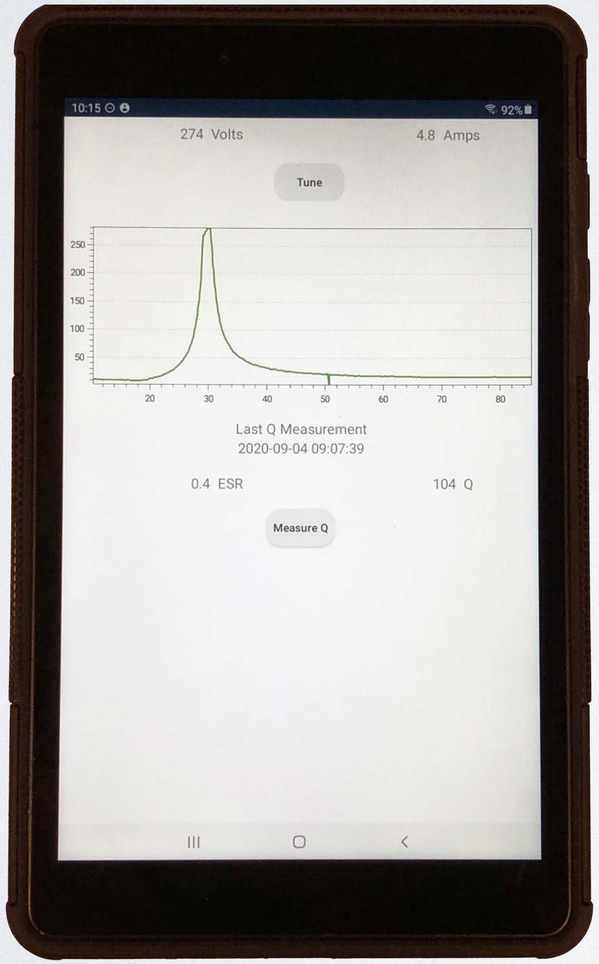
$$Q = 2\pi f \frac{L}{C}$$

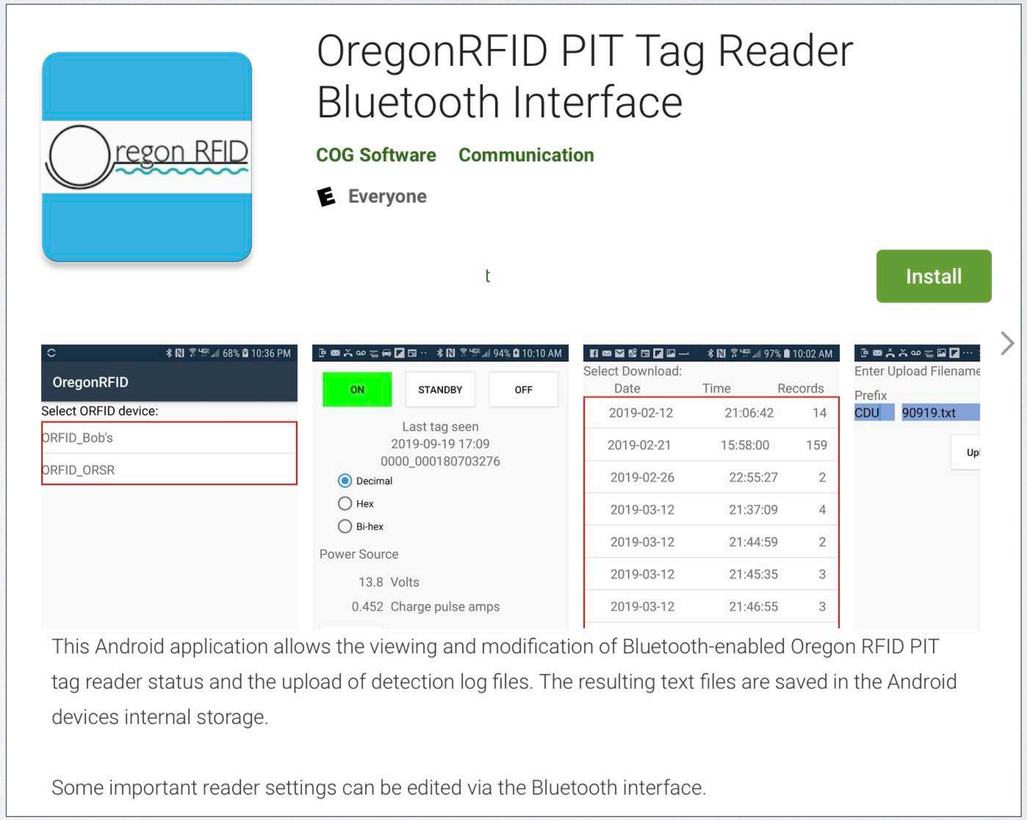
Q is set by the ratio of L and C

The peak and shape are important. The left-right location of the peak is not important and is determined by the inductance.



Antenna Q Plot





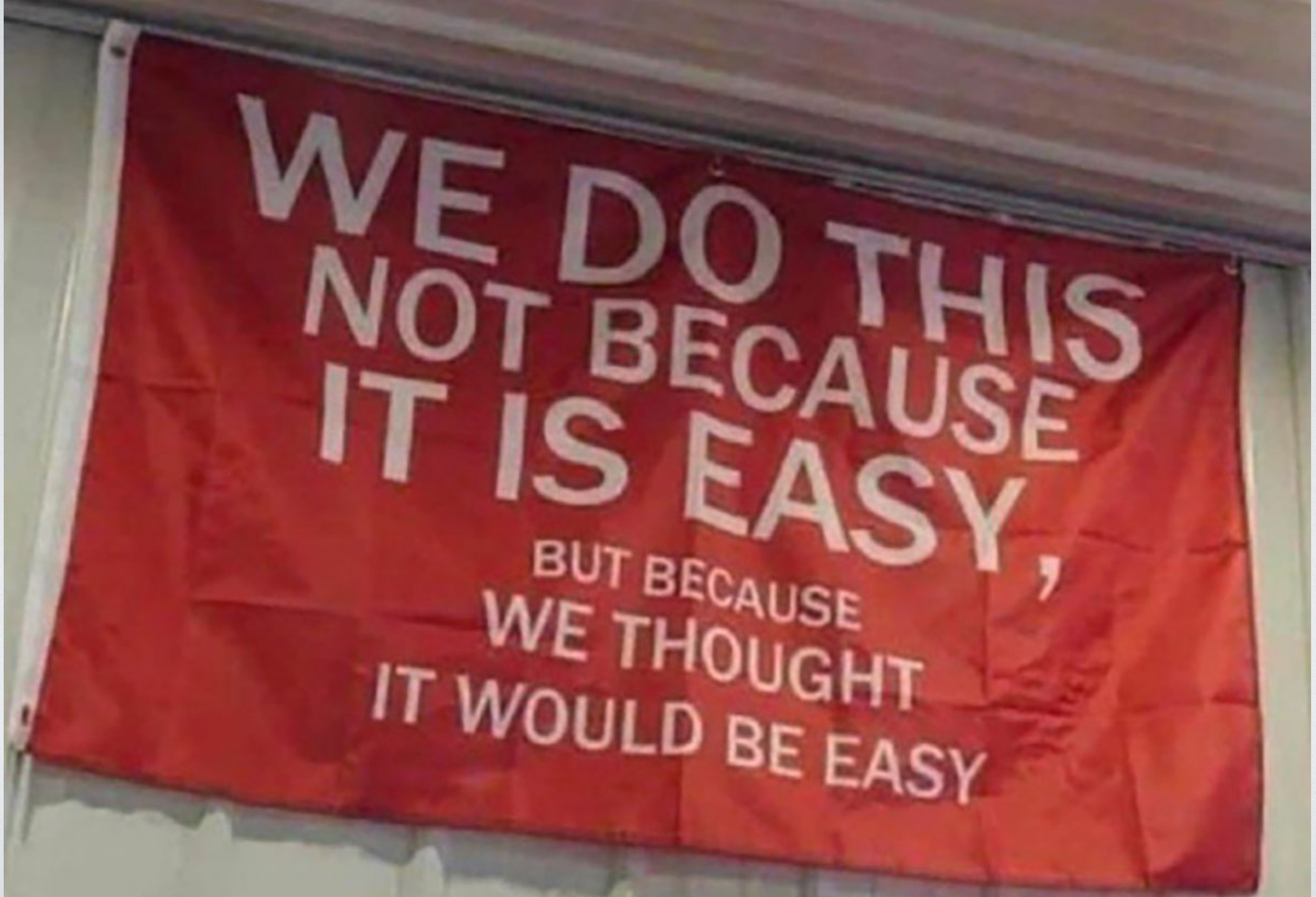
This Android application allows the viewing and modification of Bluetooth-enabled Oregon RFID PIT tag reader status and the upload of detection log files. The resulting text files are saved in the Android devices internal storage.

Some important reader settings can be edited via the Bluetooth interface.

Open Discussion

Questions
Challenges
Problems
Photos

Solutions
Successes
Failures
Plans


WE DO THIS
NOT BECAUSE
IT IS EASY,
BUT BECAUSE
WE THOUGHT
IT WOULD BE EASY