# **BlueDentist**

### Bluetooth Monitoring Using Software-Defined Radios and GPU Processing

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### Background

With the explosion of connected electronic devices, wireless security efforts are being demanded. BlueDentist records and identifies local Bluetooth devices, which are traditionally hard to track due to unadvertised presence and frequency hopping.

### Overview

BlueDentist utilizes a software defined radio to collect data from a large band of frequencies. The on-board NVIDIA Jetson Xavier efficiently processes the large stream of data in order to provide identifying details of all local Bluetooth devices, recording them to the integrated SSD storage. The hardware platform is adaptable to monitor additional communication protocols.



# CACI GSLABS

## Key Components

- Bluetooth SDR: XTRX
- Monitors for Bluetooth activity
- 12 bit DAC/ADC Resolution
- Tuning range: 30 MHz to 3.8 GHz

<u>System GPU: Nvidia Jetson Xavier</u> - CUDA enabled: accelerates processing of radio data to identify Bluetooth signals

Supervisor MCU: STM32L4R5ZIT6

- Manages GPU and board peripherals

Software Flow

Establish

noise floor

Identify

bluetooth

access codes

- Up to 120 MSPS allows for high bandwidth monitoring

- 512-Core Volta GPU - 64 Tensor cores



Collect Data

Filter packets

based on

power

threshold

### **Printed Circuit Board**



### System Block Diagram

Carrier Base Board SOM I/O: HDMI, USB 3, Ethernet SYS VIN H USB, LAN Regulat Cooling Fan M.2 SSD (M.2 NVME SYS VIN MV PCIe x4 Voltage Regulato vidia Jetson Xavier SON MOLEX Connecto XTRX SDR (mini PCle) PCIe x2 UART, I2C, SPI, GPIO UART, I2C, SPI, GPIO Main Ex

#### Acknowledgements

Sample

Bluetooth

Band

Log bluetooth

activity and

save packet

for inspecti

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